

Table 1-1. Contaminant releases to the subsurface at LLNL Site 300.

Operable Unit	Release points (DOE release site ID#)	Release mechanism	Soil/rock contaminants of concern	Ground water contaminants of concern	Status
General Services Area (GSA) [Operable Unit (OU) 1] 8 release points	Dry Well 875-S1 (0011) Dry Well 875-S2 (0012) Dry Well 872-S (0009) Dry Well 873-S (0010) B879 Steam Cleaning Facility (0005) B875 Drum Rack (0008) Debris Burial Trench #1 (0006) Debris Burial Trench #3 (0007)	Discharge of trichloroethylene (TCE)-based degreasing fluid to dry wells. Surface spills at steam cleaning area and drum rack. Leaching from volatile organic compound (VOC)-contaminated shop waste in burial trenches.	<u>Subsurface soil only:</u> VOCs	VOCs	The dry wells were excavated and closed in 1984. TCE was present as a Dense Non-Aqueous Phase Liquid (DNAPL) during initial investigation. GSA OU Record of Decision (ROD) was signed in 1997. Ground water and soil vapor extraction are ongoing as remedial action as described in the GSA ROD and Remedial Design report.
Building 834 (OU 2) 8 release points	Pump Station 834B (0019) Pump Station 834C (0020) Pump Station 834D (0021) Test Cell 834E (0022) Test Cell 834F (0023) Test Cell 834H (0025) Test Cell 834J (0026) Septic System Effluent (0018)	Surface spills and piping leaks of TCE-based heat exchange fluid and silicone-based pump seal lubricant.	<u>Subsurface soil only:</u> VOCs	VOCs Tetra-butyl-orthosilicate (TBOS) Tetra-kis-2-ethylbutyl orthosilicate (TKEBS) Nitrate	TCE is present as DNAPL; TBOS and TKEBS are present as a Light Non-Aqueous Phase Liquid (LNAPL). Some excavation of VOC-contaminated soil was performed in 1983. An interim ROD was signed in 1995. Ground water and soil vapor extraction are ongoing. Surface water drainage diversion, innovative remedial technology evaluations, and additional monitor well installations have been performed.
Pit 6 Landfill (OU 3) 2 release points	Shipment cell 55 (0028) Trench 3 (0028)	Leaching from unlined landfill. Tritium released from shipment cell 55, VOCs from trench 3.	None	VOCs Tritium Nitrate Perchlorate	Waste contaminated with uranium-238 was exhumed in 1971. The landfill was capped as a removal action in 1997. VOC concentrations in ground water have naturally attenuated to near or below Maximum Contaminant Levels.
High Explosive (HE) Process Area (OU 4) 13 release points	Building 815 TCE Hardstand (0030)	Surface spills at the drum storage and dispensing area for the former Building 815 steam plant, where TCE was used to clean pipelines.	<u>Subsurface soil only:</u> VOCs	VOCs Carbon disulfide	Ground water extraction is planned as a removal action to control offsite VOC plume migration.
	Building 810 Dry Well	Discharge of waste fluids to dry well 810A.	<u>Subsurface soil only:</u> VOCs	None	Dry well no longer receives contaminated waste water.
	HE Lagoon 806/ 807 HE Lagoon 807A HE Lagoon 807B HE Lagoon 814 HE Lagoon 817 HE Lagoon 825 HE Lagoon 826 HE Lagoon 827C/ D (0031) HE Lagoon 827E (0031) HE Lagoon 828	Infiltration of high explosive rinse water at ten lagoons.	<u>Subsurface soil:</u> HE Compounds (RDX and HMX) <u>Surface soil:</u> HE Compounds (RDX and HMX)	HE Compounds Nitrate Perchlorate	Lagoon closures completed in 1985-1989.
	HE Burn Pits	Leaching from explosives and VOC-contaminated burn debris.	<u>Surface soil:</u> HE Compounds	VOCs Nitrate Perchlorate	Burn pits capped and closed under RCRA in 1998.

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Operable Unit	Release points (DOE release site ID#)	Release mechanism	Soil/rock contaminants of concern	Ground water contaminants of concern	Status
Building 850/Pits 3 & 5 (OU 5) 6 release points	Building 850 Firing Table (0040)	Leaching from firing table gravel. Dispersion of contaminated shrapnel during explosives testing.	<u>Subsurface soil:</u> Tritium Uranium-238 <u>Surface soil:</u> Metals: Be, Cd, Cu Polychlorinated biphenyls (PCBs) Dioxins and furans Uranium-238 HMX	Tritium Uranium-238 Nitrate	Gravel was removed from the firing table in 1988. PCB-contaminated shrapnel was removed in October 1998.
	Building 850 Sand Pile (0042)	Leaching from sand pile adjacent to firing table.	<u>Subsurface soil only:</u> Tritium	Tritium	Use of stockpiled sand in experiments ceased in 1972.
	Pit 1 Landfill	Leaching from unlined landfill.	None	Perchlorate	The Pit 1 Landfill was closed to waste disposal in 1988. RCRA capping, drainage diversion, and closure for source control completed in 1992.
	Pit 3 Landfill (0048)	Leaching from unlined landfill.	<u>Surface soil:</u> Tritium <u>Subsurface soil:</u> Tritium	Tritium Uranium-238	The Pit 3 Landfill was closed to waste disposal in 1967. Approximately 25-30% of the Pit 3 Landfill overlaps with the Pit 7 Landfill which was capped in 1992-3.
	Pit 5 Landfill (0053)	Leaching from unlined landfill.	<u>Subsurface soil only:</u> Tritium Uranium-238	VOCs Tritium Uranium-238 Nitrate	The Pit 5 Landfill was closed to waste disposal in 1979.
	Pit 7 Landfill	Leaching from unlined landfill.	<u>Surface soil:</u> Uranium-238 <u>Subsurface soil:</u> Uranium-238	Uranium-238	RCRA capping, drainage diversion, and closure for source control completed in 1992. No further action on pit contents and deletion as an OU suggested by regulatory agencies at December 8, 1993 Remedial Project Manager's (RPM) meeting. Uranium-238 contamination in ground water addressed in SWFS as part of Building 850 OU but no Pit 7 specific source control measures are evaluated.
Building 854 (OU 6) 4 release points	Building 854D (0045) Building 854E (0045) Building 854F (0045) Building 854H Drain Outfall (0046)	Surface spills of TCE-based heat exchange fluid.	<u>Surface soil:</u> Metals: Pb, Zn PCBs Tritium HE Compound (HMX) <u>Subsurface soil:</u> VOCs	VOCs Nitrate Perchlorate Tritium Uranium-238 (1 well)	VOC-contaminated soil was excavated in 1983 in the vicinity of the Building 854H drain outfall. The TCE brine systems were removed in 1989. Site investigation is proceeding.

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Operable Unit	Release points (DOE release site ID#)	Release mechanism	Soil/rock contaminants of concern	Ground water contaminants of concern	Status
Building 832 Canyon (OU 7) 2 release points	Building 830 (0057)	Surface spills of TCE-based heat exchange fluid.	<u>Subsurface soil only:</u> VOCs	VOCs Nitrate Perchlorate	Treatability Study underway to evaluate ground water and soil vapor extraction.
	Building 832 (0058)	Surface spills of TCE-based heat exchange fluid. HE rinse-water disposal.	<u>Surface soil:</u> HE Compound (HMX) <u>Subsurface soil:</u> VOCs HE Compound (HMX) Nitrate	VOCs Nitrate Perchlorate	Treatability Study underway to evaluate ground water and soil vapor extraction.
Site 300 Operable Unit (OU 8) 8 release points	Building 801 Firing Table (0036)	Dispersal of firing table debris.	<u>Surface soil:</u> Metals: Be, Cd, Cu Uranium-238 <u>Subsurface soil:</u> None	Nitrate	Firing table gravel was removed in 1988, and replaced periodically afterward. Some soil beneath the firing table gravel was also removed. Use of this firing table was discontinued in 1998. Firing table gravels and surface soil in the vicinity of the firing table were removed under RWQCB oversight.
	Building 801 Dry Well (0066)	Waste fluid discharges to dry well beneath Building 801D.	<u>Subsurface soil:</u> VOCs	VOCs	Dry well was filled with concrete and closed in 1981.
	Building 802 Firing Table (0037)	Dispersal of firing table debris.	<u>Subsurface soil:</u> None <u>Surface soil:</u> None	None	Firing table gravel was removed in 1988.
	Building 833 Area: Building 833 Disposal Lagoon (0059) Area north of Building 833 (0056) Building 833 Test Cell and Settling Basin (0060)	Surface discharge of waste fluids.	<u>Subsurface soil only:</u> VOCs	VOCs	Monitoring-only remedy accepted at December 8, 1993 RPM meeting.
	Building 845 Firing Table (0044)	Dispersal of firing table debris.	<u>Subsurface soil only:</u> HE Compound (HMX) Uranium-238	None	Firing table gravel and some soil from the firing table berm was removed in 1988. Explosive Waste Treatment Facility being constructed in the area as RCRA unit.
	Building 851 Firing Table (0043)	Dispersal of firing table debris.	<u>Surface soil:</u> HE compound (RDX) Uranium-238 Metals: Cd, Cu, Zn <u>Subsurface soil:</u> VOCs Uranium-238	VOCs Uranium-238	Firing table gravel was removed in 1988, and replaced periodically afterward.

Table 1-2. Sites where a remedy has been previously agreed upon or completed as a Removal Action.

Release point	History	Included in Site-Wide Feasibility Study
General Services Area (GSA)	GSA Operable Unit (OU) Record of Decision (ROD) was signed in 1997.	No. Remedial actions in the GSA are being performed as required in the GSA ROD and Remedial Design report. These GSA documents are incorporated into the site-wide CERCLA process by reference.
Pit 6	Capped as a source control removal action in 1997. The closure of the Pit 6 Landfill is documented in the "Feasibility Study/EE/CA" (Devany et al., 1994), the "EE/CA Addendum" (T.R. Berry, 1996), and the "Action Memorandum" (T.R. Berry, 1996). Ongoing monitoring is conducted under a "Post-Closure Plan" (Ferry, 1998).	Tritium and volatile organic compound (VOC) contamination in ground water are addressed. No further source control measures are evaluated.
HE Lagoon 806/807 HE Lagoon 807A HE Lagoon 807B HE Lagoon 814 HE Lagoon 817 HE Lagoon 825 HE Lagoon 826 HE Lagoon 827C/D HE Lagoon 827E HE Lagoon 828	Capping of lagoons for source control was completed in 1985-1989 under Regional Water Quality Control Board oversight. The closure of these lagoons is documented in the "Closure Plan for the Decommissioned HE Rinsewater Lagoons" (Carpenter et al., 1988).	High explosive (HE) compound, nitrate, and perchlorate contamination in ground water are addressed as part of the HE Process Area OU. No further source control measures are evaluated.
HE Open Burn Pits	Capped under RCRA as a source control measure in 1998. The closure of the HE Open Burn Pits is documented in the "Closure Plan for the HE Open Burn Treatment Facility" (DOE, 1997).	VOC, nitrate, and perchlorate contamination in ground water is addressed as part of the HE Process Area OU.
Pit 7	RCRA capping and closure for source control completed in 1992. Ongoing monitoring is conducted under a Post-Closure Plan. The closure of Pits 1, 4, and 7 is documented in the "RCRA Closure and Post-Closure Plans for Landfill Pits 1 and 7" (Corey, 1988).	Uranium contamination in ground water is addressed as part of the Building 850/Pits 3 & 5 OU. Source control measures have been implemented.

Table 1-3. Lithologic descriptions of geologic units at Site 300.

Epoch	Geologic unit	Formation/member	Depositional environment	Lithologic characteristics	Occurrence at Site 300
Holocene	Surficial Materials	Colluvium, alluvium and valley fills (Qal), landslides (Qls)	Continental mass wasting, fluviatile	Silty clay, sand, and gravel.	Qal is present in ravines throughout Site 300. Local landslide deposits (Qls) are present throughout Site 300. A fairly large area in the southern portion of the West Firing Area is covered by Qls deposits.
Pleistocene	Older sediment	Landslides (Qls), terrace deposits (Qt)	Continental, predominantly fluviatile	Silty clay, silt, sand, and gravel, often partly cemented.	Terrace alluvium deposits (Qt) are present in the vicinity of the Pit 6 Landfill, GSA, HE Process Area, and Building 833.
Pliocene	Older sediments	<i>Unconformity</i>			
		Nonmarine sedimentary rocks	Continental fluviatile, lacustrine		
		Tps		Semilithified, green, brown, and red clay and silt.	The Tps unit occurs in the southeastern and northern parts of Site 300, and is generally present only on hilltops.
Miocene	San Pablo Group	Tpsg	Channel deposits	Gravel and gravelly sand.	The Tpsg unit is present only in the vicinity of Building 834.
		<i>Unconformity</i>			
		Neroly Formation (Tn)	Continental, fluviatile, lacustrine	See description of individual members below.	See description of individual members below.
		Informal members of Tn:			
		Tnsc ₂ (Upper siltstone and claystone)		Heterogeneous claystone and siltstone with sandstone interbeds.	The Tnsc ₂ stratigraphic unit is present in the HE Process Area, Building 832 Canyon OU, and in the vicinity of Building 833 and Building 834.
		Tnbs ₂ (Upper blue sandstone)		Fine- to medium-grained, blue gray and brown silty sandstone.	Tnbs ₂ beds are present throughout most of the southeastern part of Site 300 and locally in the northern part of the site.
		Tnsc ₁ (Middle siltstone and claystone)		Light gray to greenish gray claystone, mudstone; with fine-grained silty sandstone interbeds.	The Tnsc ₁ stratigraphic unit is present beneath the HE Process Area, Building 832 Canyon, Building 834, Building 833 and the central GSA, and locally in the northern part of the site.
		Tnbs ₁ (Lower blue sandstone)		Very fine- to coarse-grained, blue gray silty with tuffaceous claystone, siltstone, and conglomerate interbeds.	The Tnbs ₁ stratigraphic unit is present throughout Site 300 except in the extreme northwest and northeast corners of the site. In those locations, it has been removed by erosion, and older bedrock (usually Tmss) is exposed at the surface.
Paleocene/ Eocene		Cierbo Formation (Tmss)	Littoral, varying from shallow marine to continental	Friable, yellow gray quartz-rich sandstone, claystone, chert pebble conglomerate, and gray clay shale.	The Cierbo Formation is present in the northwest part of Site 300 at the surface or at relatively shallow depths. Elsewhere, this formation is present at depths exceeding 550 feet. In the Pit 6 Landfill OU, the unit is nearly vertical.
		<i>Unconformity</i>			
		Tesla Formation (Tts)	Brackish water to marine	Quartz-mica sandstone and claystone.	Tts is present only along the southwestern edge of Site 300 near the Pit 6 Landfill. In this area the beds are nearly vertical.
Upper Cretaceous	Great Valley Sequence (Kgv)	Panoche Formation (Kps) and Moreno Shale (Km)	Deep oceanic trough floor grading up to subsea fans, forearc basin setting	(Kps) Arkosic sandstone with large concretions, micaceous shale interbeds; (Km) marines shale with sandstone interbeds.	The Great Valley Sequence (Kgv) is present along the northern part and west-central boundary of Site 300 at the surface or at relatively shallow depths. Elsewhere, this formation is assumed to be present at depth but has not been penetrated by boreholes.

Table 1-4. Description of hydrogeologic units in Site 300 Operable Units.

Operable Unit (OU)2: Building 834	
<p>In the Building 834 (B834) OU, ground water occurs primarily in a shallow, perched water-bearing zone and in the deeper Neroly Formation (Tnbs₁) regional aquifer. Three principal hydrogeologic units have been defined in the OU: The Qt-Tnsc₂, the Tnbs₂-Tnsc₁, and the Tnbs₁. The hydrogeologic system at the B834 OU consists of a shallow saturated zone underlain by a unit of lower permeability (Qt-Tnsc₂), a predominately unsaturated zone underlain by a second unit of lower permeability (Tnbs₂-Tnsc₁), and then, at depth, a thick sequence of claystone and sandstone of the Tnbs₁ regional aquifer.</p>	
Hydrogeologic Unit	Description
Qt- Tnsc₂	<p>The Qt-Tnsc₂ hydrogeologic unit consists of four stratigraphic units: Quaternary terrace deposits (Qt), Tpsg gravels, semilithified clays and silts of the Tps, and Tnsc₂ siltstone/claystones. The Qt-Tnsc₂ hydrogeologic unit contains two sub units: the Qt-Tpsg, or "perched zone," and the Tps-Tnsc₂, or "perching horizon." The Qt deposits are present in small, laterally discontinuous exposures at the ground surface, frequently associated with topographic highs. Borehole logs indicate these units are unsaturated. The Tpsg unit consists of heterogeneous silty sand to sandy gravel. The coarser-grained beds nearer to the base of the unit contain a saturated zone about a quarter of a mile long by 600 ft wide, and commonly no greater than 5 ft thick. Depth to the water table of this perched water-bearing zone varies from 20 to 70 ft under unconfined conditions. The hydraulic conductivity of this subunit is 10⁻⁴ cm/sec. Ground water flows generally north to south. Well yields in this unit range from <1 to 25 gpm.</p> <p>The Tps-Tnsc₂ subunit consists of lower-permeability clay, silt, and claystone that act to perch shallow ground water. The thickness of this aquitard varies from 10 to 80 ft. Some silty sandstones that contain ground water under confined conditions are also present within this unit. The hydraulic conductivity of these more permeable sandstones are around 10⁻⁶ to 10⁻⁷ cm/sec. These localized silty sandstone lenses yield minor quantities of water to wells.</p>
Tnbs₂-Tnsc₁	<p>This unit consists of laterally continuous, fine- to medium-grained silty sandstone (Tnbs₂), generally 30- to 40-ft thick, which is unsaturated. The Tnbs₂ sandstone is underlain by a 33- to 75-ft thick sequence of interbedded claystone, siltstone, and discontinuous silty sandstone (Tnsc₁). The estimated hydraulic conductivity of the Tnbs₂ is around 10⁻⁵ cm/sec.</p>
Tnbs₁	<p>This hydrogeologic unit consists of interbedded siltstone, claystone, sandstone, and conglomerate. The Tnbs₁ aquifer is unconfined beneath the Building 834 OU. Depth to ground water ranges from 130 to 280 ft. The saturated thickness of this unit is unknown as wells drilled in the area have not fully penetrated the Tnbs₁. Hydraulic conductivity values range from 10⁻³ to 10⁻⁴ cm/sec. Ground water flows generally southward. Well yields range from <1 to 5 gpm. The Tnbs₁ regional aquifer serves as a general water-supply aquifer for Site 300 and nearby ranches.</p>

**Table 1-4. Description of hydrogeologic units in LLNL Site 300 Operable Units.
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OU3: Pit 6 Landfill	
<p>The Pit 6 Landfill OU is located in the southwestern corner of Site 300 adjacent to Corral Hollow Creek; situated on topographically elevated Quaternary terrace deposits overlying Tertiary bedrock. Two hydrogeologic units have been defined in the Pit 6 Landfill OU: the Qt-Tmss and Qal-Tts hydrogeologic units. The hydrogeologic units are hydraulically separated by faulting and lithologic discontinuities.</p>	
Hydrogeologic Unit	Description
Qt-Tmss	<p>The Qt-Tmss hydrogeologic unit is restricted to the area north of Corral Hollow Road and consists of stratigraphic units Quaternary terrace deposits (Qt), the lower blue sandstone member of the Neroly Formation (Tnbs₁), and the Cierbo Formation (Tmss). Saturation in the Qt unit is laterally discontinuous and consists of, at most, a few feet of saturated silty gravel overlying an irregular bedrock contact. Water in the Qt unit communicates directly with the underlying Tnbs₁ and Tmss bedrock units. This water-bearing zone extends to a depth of at least 245 ft. Hydraulic conditions range from unconfined to confined. Only the Tnbs₁ stratigraphic unit yields useful quantities of water. Depth to water ranges from 25 to 75 ft below ground surface (bgs). Hydraulic conductivities range from 10⁻² to 10⁻⁵ cm/sec in the shallow dipping bedrock and from 10⁻³ to 10⁻¹⁰ in the near vertical bedrock. Well yields vary from <1 to 180 gpm in the Tnbs₁ with low yields to dry-out conditions in wells completed in the Qt and Tmss.</p> <p>North of the Carnegie Fault Zone, ground water in the Qt-Tmss hydrogeologic unit flows in a south to southeast direction, at an estimated average rate of 30 feet per year. In the fault zone, ground water flows to the southeast.</p>
Qal-Tts	<p>The Qal-Tts hydrogeologic unit is restricted to the area south of Corral Hollow Road and southern half of the Carnegie SVRA residence area. This hydrogeologic unit consists of Quaternary alluvium (Qal) and the Tesla Formation (Tts) stratigraphic units. Ground water elevations in the Qal-Tts hydrogeologic units beneath the Corral Hollow Creek floodplain are typically 25 to 30 ft lower than in the Qt-Tmss hydrogeologic unit. Shallow ground water is ephemeral and present locally in the Qal unit of the Corral Hollow Creek floodplain. Following heavy precipitation, ground water in the Qal probably flows eastward in the same direction as surface flow. The direction of underlying flow in the Tts is undetermined. Hydraulic conditions range from unconfined to confined. Hydraulic conductivities in this hydrogeologic unit range from 10⁻³ to 10⁻⁷ cm/sec. Well yields are low; typically in the 0.5 to 3 gpm range.</p>
OU4: HE Process Area	
<p>Six hydrogeologic units have been identified in the HE process area. The Qal, Tps, the Neroly upper blue sandstone (Tnbs₂), and the Neroly Formation lower blue sandstone (Tnbs₁) units are the four principal water-bearing strata in the OU. Ground water has also been encountered locally in the Qal, Tnsc₂, and Tnsc₁ hydrogeologic units. The Tnsc₂ and Tnsc₁ hydrogeologic units function as confining layers.</p>	

Table 1-4. Description of hydrogeologic units in LLNL Site 300 Operable Units.
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Hydrogeologic Unit	Description
Qal	Quaternary alluvial deposits (Qal) are saturated in the Corral Hollow Creek floodplain along the southern site boundary. Depth to ground water is about 20 to 25 ft bgs. The saturated thickness is approximately 10 to 20 ft. Ground water in the Qal hydrogeologic unit is unconfined. Hydraulic conductivity estimates range from 10^{-2} to 10^{-3} cm/sec. Typical well yields in this unit are around 3 gpm. Beneath the saturated portions of the Qal materials, a sequence of low permeability silt and clay serves as a confining layer between the saturated Qal sediments and the Tps hydrogeologic unit below. The saturated thickness of this unit is approximately 10 to 20 ft.
Tps	Tps sediments cover much of the southeastern portion of the HE Process Area OU. The Tps hydrogeologic unit contains several discontinuous perched water-bearing zones that are limited in lateral extent and saturated thickness. When present, ground water is typically encountered in channels of sandy gravel. The maximum saturated thickness of the Tps water-bearing zone is 12 ft. The depth to the primary perched Tps ground water bearing zone is 25 to 50 ft. The average hydraulic conductivity of the Tps unit is typically moderately low (10^{-4} cm/sec). Ground water in the Tps water bearing zones generally flows toward the south-southeast. Typically, well yields are <0.5 gpm. The Tps water-bearing gravel is underlain by low-permeability claystone and siltstone of the Tnsc ₂ unit, which acts as a lower confining layer.
Tnsc₂	The Tnsc ₂ unit is unsaturated throughout most of the OU. Discontinuous silty sandstone interbeds become saturated in the southern portion of the OU. Depth to water ranges from 83 ft in the north to flowing artesian in the southeast part of the OU. Hydraulic conditions range from semi-confined to flowing artesian. The hydraulic conductivity of this unit is low, on the order of 10^{-7} cm/sec. Ground water in this unit flows to the south-southeast. Typical well yields are <1 gpm. Low permeability siltstone and claystone beds of the Tnsc ₂ function as a confining layer between the Tps and Tnbs ₂ units.
Tnbs₂	Although present throughout most of the central and southeastern portion of Site 300, the unit is only saturated in the southeastern part of the OU. Depth to ground water ranges from a few inches to several feet above ground in the south where the aquifer is free flowing artesian to 157 ft below ground surface (bgs) in the northern part of the OU where it is unconfined. The aquifer is saturated downgradient of Building 814, and becomes confined (and flowing artesian) to the south. The saturated thickness ranges from 0 ft in the north and east to approximately 70 ft in the south. The average hydraulic conductivity is on the order of 10^{-4} cm/sec. Well yields range from 1 gpm in the north to 43 gpm in the south. The upper siltstone/claystone unit (Tnsc ₂) serves as an upper confining layer, and the lower siltstone/claystone unit (Tnsc ₁) serves as a lower confining layer to the Tnbs ₂ aquifer. Ground water from the Tnbs ₂ is used offsite for agricultural purposes.
Tnsc₁	The Tnsc ₁ is a relatively thick sequence of low permeability siltstone and claystone beds, with minor saturated silty sandstone lenses. The saturated thicknesses of the discontinuous Tnsc ₁ water-bearing zones vary from 2 to 28 ft. Depths to localized saturated zones range from 88 ft in the northwest to 226 ft in the east. Hydraulic conductivity is estimated to be on the order of 10^{-7} cm/sec.

**Table 1-4. Description of hydrogeologic units in LLNL Site 300 Operable Units.
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<i>Tnsc₁ cont.</i>	Ground water in this unit flows to the south-southeast. Typical well yields range from <1 to 5 gpm. The <i>Tnsc₁</i> underlies the <i>Tnbs₂</i> and conformably overlies the <i>Tnbs₁</i> ; it serves as a confining layer between these two aquifers.
<i>Tnbs₁</i>	The <i>Tnbs₁</i> is saturated beneath the OU and offsite to the south, but has not been fully penetrated by any borehole. The unit is estimated to be greater than 200 ft thick beneath the OU and probably consists of several water-bearing zones separated by claystone-siltstone aquitards of at least local extent. Depth to water ranges from 375 ft under water table conditions in the northwest to less than 50 ft in the south where the unit is confined. Hydraulic conductivity is estimated to be on the order of 10^{-3} cm/sec. The hydraulic gradient for the <i>Tnbs₁</i> aquifer is generally toward the south-southeast. Well yields range from 3 to >200 gpm. This regional aquifer serves as a general water-supply aquifer for Site 300 and nearby ranches.
OU5: Building 850/Pits 3 & 5	
The Building 850 OU is located in the West Firing Area of Site 300 and is underlain by one hydrogeologic unit; the Qal-Tmss hydrogeologic unit. This hydrogeologic unit consists of three stratigraphic units; Qal, the Neroly lower blue sandstone (<i>Tnbs₁</i>), and the underlying Cierbo Formation (Tmss). Two water-bearing zones have been identified in this hydrogeologic unit. Ground water in the first, shallow zone is found in shallow alluvium (Qal), and permeable sandstones and fractured claystones of the <i>Tnbs₁</i> and upper Cierbo Formation. A second, deeper water-bearing zone has been identified in deeper Cierbo Formation sandstones. These two water-bearing units are separated by a thick, claystone confining layer.	
Hydrogeologic Unit	Description
<i>Qal-Tmss</i>	<p>Multiple water-bearing zones are present within the Neroly <i>Tnbs₁</i> and underlying Cierbo Formation (Tmss). These zones generally occur within sandstone units and in fractured claystones. Ground water flows generally east-northeast. Hydraulic conductivities range from 10^{-2} to 10^{-5} cm/sec with conductivities of the Qal generally much greater than the bedrock values. The shallow water-bearing zones are all unconfined. Deeper ground water in the Cierbo Formation sandstone is confined by a thick, claystone aquitard that caps the Cierbo Formation, providing significant confining pressure. This condition results in an upward gradient between the deep Cierbo Formation sandstone aquifer and shallower water-bearing zones. Near the head of Doall Ravine, much of the ground water flow in bedrock appears to be captured by the more permeable ravine fill (Qal), which provides a preferential flowpath for both water and contaminants. Ground water flows east-northeast through the ravine, then more southeasterly adjacent to the northeastern portion of the ravine. Typical well yield are <0.5 gpm in the shallow zones to >20 gpm in the deeper Cierbo Formation sandstone.</p> <p>Depth to water ranges from 15 ft in the Pits 3 and 5 valley to 75 ft in the hills above Pit 1. The saturated thickness varies from 5 ft in the Pits 3 and 5 valley to 250 ft in the hills above Pit 1. Hydraulic conductivities range from 10^{-6} cm/sec in the claystones to 10^{-2} cm/sec in sandstones.</p>

**Table 1-4. Description of hydrogeologic units in LLNL Site 300 Operable Units.
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OU6: Building 854	
<p>The Building 854 OU is located on the southern limb of the west-southeast trending Patterson Anticline and is underlain by one hydrogeologic unit; the Qls-Tmss hydrogeologic unit. This hydrogeologic unit consists of three stratigraphic units; Quaternary landslide deposits (Qls) the Neroly lower blue sandstone (Tnbs₁), and the underlying Cierbo Formation (Tmss). Two water-bearing zones have been identified in this hydrogeologic unit. The first, perched aquifer is comprised of sandstones of the Tnbs₁ and upper Cierbo. A second, deeper water-bearing zone has been identified in the lower Cierbo which appears to be separated from the shallow water-bearing zone by a relatively impermeable confining layer.</p>	
Hydrogeologic Unit	Description
Qls-Tmss	<p>Much of the OU is immediately underlain by a landslide deposit (Qls) which appears to be unsaturated throughout the OU. The first water-bearing zone, comprised of the Tnbs₁ sandstone and upper Cierbo Formation, extends throughout the OU. Depth to water ranges from 0 to 180 ft. This 10 to 20 ft thick water-bearing zone is unconfined and occurs in permeable sandstone and fractured claystone. This zone appears to be perched as there is unsaturated permeable material below the confining layer. The confining layer for this zone is a low permeability siltstone or expansive clay, depending on the location. Flow in the first water bearing zone appears to be generally to the southeast, with a more easterly flow direction near the core of the complex. Well yields range from 0.5 to 5 gpm.</p> <p>At least one deeper water-bearing zone in the Tmss has been encountered below the first. This deeper water-bearing zone is found at a minimum of 50 ft below the first water-bearing zone under confined conditions.</p> <p>Data are presently insufficient to determine depth to water and the hydraulic conductivities in the second water-bearing zone. Hydraulic testing is underway to determine these values.</p>
OU7: Building 832 Canyon	
<p>The Building 832 Canyon OU is located on the eastern limb of a gently south-plunging syncline, the axis of which is located in the HE Process Area to the west. Neroly Formation bedrock units form the canyon walls, and Quaternary alluvium (Qal) occurs in the entrenched stream channels on the canyon floor. Four hydrogeologic units have been identified in the Building 832 Canyon OU: the Qal, the Tnbs₂ upper blue sandstone, the Tnsc, siltstone/claystone, and the Tnbs₁ lower blue sandstone. Most contaminants of concern in the OU are found in hydrogeologic units that are from 15 to 60 ft below the ground surface. This environment is strongly influenced by seasonal rainfall infiltration, and multi-year droughts. These rainfall events can cause flushing and dilution of contaminants in the shallow hydrogeologic units. Also of major importance in the OU is the Canyon topography channeling water down the Canyon to the south toward the GSA and the Site 300 boundary. Both the Building 832 and the Building 830 contaminant release sites are in areas created by filling natural drainage ways, thus placing the release locations above the channel fill.</p>	
Hydrogeologic Unit	Description
Qal	<p>Quaternary alluvium is present as valley fill throughout the Building 832 Canyon. Maximum thickness of the Qal unit is about 40 feet. The extent of saturation and depth to water is variable, depending on location and recharge.</p>

Table 1-4. Description of hydrogeologic units in LLNL Site 300 Operable Units.
(Cont. Page 6 of 8)

<i>Qal cont.</i>	<p>Most recharge and subsequent ground water flow occurs during and immediately after winter storms. Ground water in this unit is unconfined, and is locally perched on low-permeability silt and clay strata. Ground water flows to the south-southeast. Intermittently, ground water from the alluvium reaches the surface and appears as shallow pools or springs. Along most of the canyon, the alluvial deposits directly overlie the Tnsc₁. In the extreme southern end of the canyon, the Qal overlies the Tnbs₂ sandstone. Well yields are not well defined, but likely vary from <1 to 5 gpm. The saturation thickness ranges from 0.5 to 12 ft, and the depth to water ranges from the surface (at springs) to 15 ft. Hydraulic conductivity is variable and ranges from low to moderate; quantification is in progress.</p>
<i>Tnbs₂</i>	<p>The Tnbs₂ is the uppermost bedrock unit present in the OU and varies in thickness from 50 to 60 ft. In most of the canyon, the Tnbs₂ unit occurs on the canyon walls, but in the southern part of the OU, near the GSA, the Tnbs₂ subcrops below the alluvium and is saturated. Ground water recharge to the Tnbs₂ bedrock units occurs predominantly through subcrops or outcrops in the canyon floor. Ground water flows in a southeast direction. Well yields are <1 gpm to 1.5 gpm. Saturation thickness varies from 5 to 50 ft. Depth to water is from 6 to 108 ft. Estimated hydraulic conductivity is low; quantification is in progress.</p>
<i>Tnsc₁</i>	<p>The Tnsc₁ unit underlies the Tnbs₂, and is approximately 90 ft thick. Typically, the Tnsc₁ acts as a low conductivity confining unit, but three higher conductivity sandstone interbeds occur within the unit. These subunits are designated Tnsc_{1c}, Tnsc_{1b}, Tnsc_{1a}, in order of increasing depth. The Tnsc_{1b} subunit is particularly important because it subcrops beneath the alluvium at Buildings 830 and 832 contaminant release sites. Locally the Tnsc_{1b} may be unsaturated between Buildings 830 and 832, but a continuous hydraulic pathway may exist in response to winter precipitation. Ground water in this subunit is partially confined, depending on location and the conductivity of the overlying alluvium. Ground water flow in the Tnsc_{1b} is to the south-southeast. The Tnsc_{1c} is a moderately permeable silty sandstone that is unsaturated at both the Building 830 and 832 source areas, but becomes saturated farther to the south. The Tnsc_{1a} does not occur at the Building 832 Complex but is saturated at Building 830. Well yields are <1 gpm in the siltstone/claystones layers of the Tnsc₁ but wells in the sandstone subunits yield up to 5 gpm.</p> <p>The saturation thickness is typically 10 to 45 ft. depth to water is commonly from 20 to 60 ft. Hydraulic conductivity of the sandstone interbeds is low to moderate, while the more clay-rich units have a low conductivity; quantification is in progress.</p>
<i>Tnbs₁</i>	<p>The upper Tnbs₁ is saturated only in the central and southern part of the OU, but the lower Tnbs₁ serves as an important regional water-supply aquifer for Site 300 and offsite property owners. Ground water in the upper Tnbs₁ is partially confined; the lower Tnbs₁ is fully confined and locally flowing artesian. In many areas, an upward vertical hydraulic gradient protects the regional aquifer from downward migration of contaminants. Ground water flow in the Tnbs₁ is to the southeast. Well yields are 1 to 14 gpm. The saturation thickness is 50 to 100 ft or more. The depth to water is 100 to 200 ft bgs, and the hydraulic conductivity is moderate to high.</p>

**Table 1-4. Description of hydrogeologic units in LLNL Site 300 Operable Units.
(Cont. Page 7 of 8)**

OU8: Site-Wide Release Sites:	
East Firing Area (EFA):	
Building 801 Dry Well Building 802 Firing Table Building 845 Firing Table	<p>The EFA is underlain by one hydrogeologic unit; the Qal-Tmss hydrogeologic unit. This hydrogeologic unit consists of three stratigraphic units; Quaternary landslide deposits, the Neroly lower blue sandstone (Tnbs₁), and the underlying Cierbo Formation (Tmss). Saturated conditions exist in the Tnbs₁ and Tmss throughout the area. Ground water in these units is unconfined to confined. Flow appears to be northeastward in the northern portion of the EFA (Building 865), eastward in the central portion (Buildings 801, 802, and 845), and southeastward in the southern portion (Building 812). This variation in flow direction results from variation in bedding dip and geologic structure (i.e. faults and folds).</p> <p>The saturated thickness varies from 10 ft near Building 812 to over 75 ft beneath Pit 1. Hydraulic conductivities in the sandstone range from 10⁻⁴ cm/sec to 10⁻² cm/sec. Depth to water varies from 5 ft to over 250 ft bgs. Well yields vary from 0.5 to 3 gpm.</p> <p>Further characterization of the Building 812, Sandia Test Site, and Building 865 (ATA) areas are scheduled for FY00-FY01.</p>
South West Firing Area:	
Building 851 Firing Table	<p>The Building 851 area is underlain by one hydrogeologic unit; the Qal-Tmss hydrogeologic unit. This hydrogeologic unit consists of three stratigraphic units; Quaternary landslide deposits, the Neroly lower blue sandstone (Tnbs₁), and the underlying Cierbo Formation (Tmss). Cierbo rocks beneath Building 851 are saturated with ground water under confined conditions. Ground water in the Tmss flows to the south.</p> <p>The saturated thickness varies from 5 to 10 ft. Hydraulic conductivities range from 10⁻⁴ cm/sec to 10⁻⁶ cm/sec. Depth to water varies from 100 to 150 ft bgs. Well yields vary from 0.5 to 2 gpm.</p>
Building 833 Area Release Sites:	
Building 833	<p>Three hydrogeologic units have been identified in the vicinity of these release sites as follows:</p> <ul style="list-style-type: none"> - Qt-Tnsc₂ hydrogeologic unit comprised of stratigraphic units Qt, Tps, Tnsc₂; - Tnbs₂-Tnsc₁ hydrogeologic unit comprised of stratigraphic units Tnbs₂ and Tnsc₁; and - Tnbs₁ hydrogeologic unit comprised of stratigraphic unit Tnbs₁. <p>Beneath Building 833 is a shallow, perched aquifer which appears to be saturated mainly after periods of rainfall. This shallow water-bearing zone is underlain by approximately 300 ft of unsaturated bedrock. A second water-bearing zone, the Tnbs₁ regional aquifer is present at depth (>300 ft). In the vicinity of Buildings 836 and 841, the shallow water-bearing zone is not present. The first water-bearing zone is encountered in the Tnbs₁ regional aquifer at depths from 115 ft (Building 841) to 280 ft (Building 865).</p>

**Table 1-4. Description of hydrogeologic units in LLNL Site 300 Operable Units.
(Cont. Page 8 of 8)**

Hydrogeologic Unit	Description
<i>Qt-Tnsc₂</i>	The Qt-Tnsc ₂ hydrogeologic unit is present only in the vicinity of Building 833. This unit consists of discontinuous areas of ephemeral, perched ground water which appears to be present mainly after periods of precipitation. Ground water, when present, is perched and unconfined. There is no evidence indicating that ground water is present in significant amounts in this hydrogeologic unit; only two monitor wells have ever contained measurable ground water in this area. Where present, depth to ground water varies from about 18 ft to 38 ft. The saturated thickness of the Qt-Tnsc ₂ unit ranges from 1 to 2 ft. Hydraulic conductivity data are not available.
<i>Tnbs₂-Tnsc₁</i>	The Tnbs ₂ -Tnsc ₁ hydrogeologic unit is present throughout the area but is saturated only in the vicinity of Spring 3. Data indicate that this unit is not saturated in the vicinity of Buildings 833, 836, and 841. The saturated thickness of this unit ranges from 0 ft beneath Building 833 to about 24 ft in the vicinity of the spring 3 drainage. Hydraulic conductivity is estimated to range from 10 ⁻³ to 10 ⁻⁷ cm/sec. Ground water in this hydrogeologic unit is semi-confined to confined and is thought to flow to the south of Spring 3. Depth to water ranges from 28 to 44 ft. The lowermost claystone of the Tnsc ₁ serves as a confining layer to the underlying Tnbs ₁ hydrogeologic unit. Wells completed in the unit yield up to 14 gpm.
<i>Tnbs₁</i>	The Tnbs ₁ hydrogeologic unit is believed to be saturated beneath Building 833, 836 and 841. Ground water has been encountered in the lower portion of the Tnbs ₁ unit near Buildings 833 and 841. The hydraulic condition of this unit ranges from semi-confined to confined due to low permeability siltstone and claystone beds present within the Tnbs ₁ . Depth to ground water is approximately 115 ft in the vicinity of Building 841 and 130 ft in the vicinity of Buildings 833 and 836. The saturated thickness of this unit has not been determined as no wells have fully penetrated the Tnbs ₁ in this area. Hydraulic conductivity ranges from 10 ⁻³ to 10 ⁻⁴ cm/sec. Well yields are less than 1 to 2 gpm. Ground water in this unit flows to the southeast.

Table 1-5. Contaminated media in Site 300 Operable Units (Operable Units 1–7).

Media	Contaminant	OU 1: GSA	OU 2: Building 834	OU 3: Pit 6	OU 4: HE Process Area	OU 5: Building 850/ Pits 3 & 5	OU 6: Building 854	OU 7: Building 832 Canyon
Ground water	VOCs	√	√ (DNAPL)	√	√	√ (Pit 5)	√	√ (B830 and 832)
	Uranium-238					√ (B850, Pits 3, 5, 7)	√ (Possibly one well)	
	HE Compounds				√ (HMX, RDX, DNT)			
	Nitrate		√	√	√	√ (B850, Pit 5)	√	√ (B830 and 832)
	Perchlorate			√	√	√ (Pits 1, 5)	√	√ (B830 and 832)
	TBOS/TKEBS		√ (LNAPL)					
	Tritium			√		√ (B850, Pits 3 & 5)	√	
	Other				√ (Carbon disulfide) ^a			
Vadose zone	VOCs	√	√		√		√	√ (B830 and 832)

Table 1-5. Contaminated media in Site 300 Operable Units (Operable Units 1–7). (Cont. Page 2 of 3)

Media	Contaminant	OU 1: GSA	OU 2: Building 834	OU 3: Pit 6	OU 4: HE Process Area	OU 5: Building 850/ Pits 3 & 5	OU 6: Building 854	OU 7: Building 832 Canyon
Vadose zone (cont.)	Uranium-238					√ (B850, Pits 5, 7)		
	HE Compounds				√ (RDX & HMX)			√ (HMX; B832)
	Tritium					√ (B850, Pits 3, 5, 7)		
	Other							√ (Nitrate)
Surface soil	Uranium-238					√ (B850, Pits 5, 7)		
	Metals					√ (Be, Cd, Cu; B850)	√ (Pb, Zn)	
	Tritium					√ (Pit 3)	√	
	HE Compounds				√ (RDX & HMX)	√ (HMX; B850)	√ (HMX)	√ (HMX)
	PCBs/CDDs/ CDFs					√ (B850)	√ (PCBs only)	
Surface water	VOCs			√ (Spring 7)	√ (Spring 5)			√ (B830, Spring 3)
	Tritium					√ (Well 8 Spring)		

Notes appear on following page.

Table 1-5. Contaminated media in Site 300 Operable Units (Operable Units 1–7). (Cont. Page 3 of 3)**Notes:**

Be = Beryllium.

Cd = Cadmium.

CDDs = Chlorinated dibenzodioxins.

CDFs = Chlorinated dibenzofurans.

Cu = Copper.

DNAPL = Dense non-aqueous phase liquid.

DNT = Dinitrotoluene.

GSA = General Services Area.

HE = High Explosives.

HMX = High melting explosives.

LNAPL = Light non-aqueous phase liquid.

Pb = Lead.

PCB = Polychlorinated biphenyl.

RDX = Research department explosive.

VOCs = Volatile organic compounds.

Zn = Zinc.

^a Contaminant not reported in last 2 years, but sampling history not yet adequate to rule out as a contaminant of concern (COC).

Table 1-6. Contaminated media in Site 300 Operable Units (Operable Unit 8).

Media	Contaminant	Building 801 dry well	Building 802 Firing table	Building 833	Building 845 Firing table	Building 851 Firing table
Ground water	VOCs	√		√		√
	Uranium-238					√
	Other	√ (Nitrate)				
Vadose zone	VOCs	√		√		√
	HE Compounds				√ (HMX)	
	Uranium-238				√	√
Surface soil	Uranium-238					√
	Metals					√ (Cd, Cu, Zn)
	HE Compounds					√ (RDX)
Surface Water		None	None	None	None	None

Notes:

Cd = Cadmium.

Cu = Copper.

HE = High Explosives.

HMX = High melting explosives.

VOCs = Volatile organic compounds.

Zn = Zinc.

Table 1-7. Estimate of area, volume, and mass of primary contaminants in the vadose zone in Site 300 OUs^a.

Location	Contaminant	Level of confidence of data	Total affected area (ft ²)	Average contaminated unsaturated thickness (ft)	Volume of contaminated soil (ft ³)	Contaminant volume (gal)	Contaminant mass (kg) or Ci
OU2: B834	VOCs	Low	24,000	25	590,000	270	1,490 kg ^b
OU3: Pit 6 Landfill	None						
OU4: HE Process Area							
B815 Hardstand	TCE Soil	Low	7,850	40	314,000	0.11	0.62 kg
	TCE Bedrock	Low	7,850	30	236,000	0.12	0.66 kg
HE Lagoons	HE Compounds	Insufficient data	–	–	–	–	–
	VOCs	Insufficient data	–	–	–	–	–
OU5: B850/Pits 3 & 5							
B850 Firing Table	Tritium	Medium	6,750	35	236,000	–	1.1 Ci (1988)
B850 Sandpile	Tritium	Medium	1,250	20	25,000	–	0.053 Ci (1989)
Pits 5 & 7	Uranium-238	Insufficient data	–	–	–	–	–
Pit 3 Landfill	Tritium	Medium	55,600 (landfill)	25	1,640,000	–	7 Ci (in landfill, 1986)
			10,000 (outside landfill)	–	–	–	15 Ci (outside landfill, 1986)
Pit 5 Landfill	Tritium	Medium	81,900 (landfill)	25	2,420,000	–	0.2 Ci (in landfill, 1986)
			15,000 (outside landfill)	–	–	–	2.5 Ci (outside landfill, 1986)
OU6: B854	VOCs	Low (estimate derived from AVI-SVS data)	126,000	70	8,790,000	13.1	72 kg
OU7: B832 Canyon	TCE	Medium	280,000	13	3,640,000	0.4	2 kg
	Nitrate	Insufficient data	–	–	–	–	–
	HE Compounds	Medium	6,000	16	96,000	–	0.4 kg

Table 1-7. Estimate of area, volume, and mass of primary contaminants in the vadose zone in Site 300 OUs^a. (Cont. Page 2 of 2)

Location	Contaminant	Level of confidence of data	Total affected area (ft ²)	Average contaminated unsaturated thickness (ft)	Volume of contaminated soil (ft ³)	Contaminant volume (gal)	Contaminant mass (kg) or Ci
OU8: Site 300							
B801 Dry Well	VOCs	Low	113	25	2,830	0.0008	0.004 kg
B833 Area	TCE	Medium	84,000	14	1,180,000	0.1	0.6 kg
B851 Firing Table	Uranium-238	Insufficient data	–	–	–	–	–

Notes:

AVI-SVS = Active vacuum induced/soil vapor survey.

Ci = Curie.

HE = High explosives.

NA = Not applicable.

OU = Operable unit.

TCE = Trichloroethylene.

VOCs = Volatile organic compounds.

^a Area, volume, and mass values are gross, conservative estimates, derived solely to (1) give a very general idea of the extent of contamination, and (2) provide engineers with rough estimates for developing and costing remedial alternatives. Where insufficient data exist for even these purposes, no estimate is presented.

^b Estimate from the 1994 Building 834 Feasibility Study. Soil vapor extraction system has extracted some mass since then.

Table 1-8. Estimate of area, volume, and mass of primary contaminants in ground water in Site 300 OUs based on the most recent data^a.

Location		Contaminant	Level of confidence of data	Total affected area (ft ²)	Average contaminated saturated thickness (ft)	Volume of contaminated water (ft ³) ^b	Contaminant volume (gal)	Contaminant mass (kg)	Activity (curies)
OU2: Building 834		TCE	Medium	538,000	3.3	532,000	28.0	155	–
		TBOS/TKEBS	Medium	3,750	3.3	3,710	1.74	5.87	–
		Nitrate	Low	575,000	3.3	569,000	–	1,860	–
OU3: Pit 6 Landfill		VOCs	Medium	97,000	43	1,250,000	0.021	0.115	–
		Tritium	Medium	60,000	10-75	705,000	–	–	0.0198
OU4: HE Process Area									
Building 815 TCE Hardstand		TCE	Low	2,120,000	40	994,000,000	3.25	18.0	–
		Tnbs ₂							
		TCE	Low	420,000	8	1,010,000	0.37	2.04	–
		Tps							
HE Lagoons		Nitrate (as NO ₃ , >45 ppm)	Low	3,940,000	45	53,200,000	–	97,500	–
		Perchlorate							
		Tnbs ₂	Low	1,860,000	40	524,000,000	–	5.08	–
		RDX							
		Tnbs ₂	Low	815,000	40	6,100,000	–	4.35	–
		RDX							
		Tps	Insufficient data	–	–	–	–	–	–
OU5: Building 850/Pits 3&5									
Building 850 Firing Table & Sandpile		Tritium	Medium	8,140,000	61.6	113,000,000	–	–	28.4
Building 850 Firing Table		Uranium-238	Low (includes uranium input from natural sources)	320,000	15	960,000	–	1.24	4.1 × 10 ⁻⁴
Pit 5 Landfill		VOCs	Insufficient extent to measure	–	–	–	–	–	–
Pits 3 & 5 Landfills		Tritium	Medium	1,860,000	18.6	8,370,000	–	–	17.7
Pits 5 & 7 Landfills		Uranium-238	Low (includes uranium input from natural sources)	500,000	15	1,500,000	–	2.54	8.4 × 10 ⁻⁴
OU6: Building 854		TCE	Low	2,000,000	15	6,000,000	2.73	15.0	–
OU7: Building 832 Canyon		TCE	Medium	1,040,000	15	4,670,000	5.39	29.8	
		Nitrate	Medium	950,000	15	4,280,000	–	12,500	–
		Perchlorate	Low	20,000	10	60,000	–	0.02	–
OU8: Site 300									
Building 801 Dry Well		VOCs	Insufficient data	–	–	–	–	–	–
Building 833 Area		TCE	Low	12,000	10	36,000	0.1	0.4	–
Building 851 Firing Table		Uranium-238	Insufficient extent to measure	–	–	–	–	–	–

Notes:

– = Not applicable.

OU = Operable Unit.

TBOS/TKEBS = Tetra-butyl-orthosilicate/tetra-kis-2-ethylbutylorthosilicate.

TCE = Trichloroethylene.

VOCs = Volatile organic compounds.

^a Area, volume, and mass values are gross, conservative estimates, derived solely to: (1) give a very general idea of the extent of contamination, and (2) provide engineers with rough estimates for developing and costing remedial alternatives. Where insufficient data exist for even these purposes, no estimate is presented.

^b A porosity of 0.30 was used to calculate saturated volumes.

Table 1-9. Substances reported in surface soil after the SWRI data cutoff (December 1991) at a frequency greater than 2%, and associated cancer risk and noncancer hazard.

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Cancer PRG ^a	Risk	Noncancer PRG ^a	Hazard quotient
OU4: HE Process Area									
Actinium-228	1	1	100	1.12	pCi/g	*	*	*	*
Bismuth-214	4	4	100	0.84	pCi/g	*	*	*	*
Lead-210	2	2	100	1.21	pCi/g	*	*	*	*
Lead-212	6	6	100	0.99	pCi/g	*	*	*	*
Lead-214	7	7	100	0.69	pCi/g	*	*	*	*
Potassium-40	7	7	100	16.6	pCi/g	*	*	*	*
Radium-228	2	2	100	0.96	pCi/g	*	*	*	*
Thallium-208	7	7	100	0.36	pCi/g	*	*	*	*
Thorium-228	1	1	100	3.78	pCi/g	1.5E-01	2.5E-05	NA	NA
Thorium-234	2	3	67	1.24	pCi/g	*	*	*	*
						Risk Total =	2.5E-05	HI =	NA
OU5: Building 850/Pits 3 & 5									
Heptachlorinated dibenzo-furans	10	10	100	1.3E-03	mg/kg	b	b	b	b
Heptachlorinated dibenzo-p-dioxins	10	10	100	1.0E-04	mg/kg	b	b	b	b
Hexachlorinated dibenzo-furans	10	10	100	1.1E-02	mg/kg	b	b	b	b
Hexachlorinated dibenzo-p-dioxins	8	10	80	2.0E-05	mg/kg	b	b	b	b
Octachlorinated dibenzo-furan	10	10	100	1.1E-04	mg/kg	b	b	b	b
Octachlorinated dibenzo-p-dioxin	10	10	100	5.5E-04	mg/kg	b	b	b	b
PCB 1254	22	41	54	180	mg/kg	b	b	b	b
Pentachlorinated dibenzo-furans	10	10	100	5.7E-02	mg/kg	b	b	b	b
Tetrachlorinated dibenzo-furans	10	10	100	4.8E-02	mg/kg	b	b	b	b
Tetrachlorinated dibenzo-p-dioxins	4	10	40	4.3E-06	mg/kg	b	b	b	b
						Risk Total =	NA	HI =	NA

Table 1-9. Substances reported in surface soil after the SWRI data cutoff (December 1991) at a frequency greater than 2%, and associated cancer risk and noncancer hazard. (Cont. Page 2 of 3)

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Cancer PRG ^a	Risk	Noncancer PRG ^a	Hazard quotient
OU6: Building 854									
Acetone	2	9	22	0.12	mg/kg	NA	NA	6.1E+03	2.0E-05
Arsenic	29	36	81	3.8	mg/kg	**	**	**	**
Barium	36	36	100	390	mg/kg	**	**	**	**
Beryllium	20	36	56	0.93	mg/kg	**	**	**	**
Cadmium	21	36	58	4	mg/kg	3.0E+03	1.3E-09	9.3E+02	4.3E-03
Chloroform	1	48	2.1	0.03	mg/kg	5.5E-01	5.4E-08	1.5E+02	2.0E-04
Chromium	35	36	97	30	mg/kg	**	**	**	**
Cobalt	34	36	94	11	mg/kg	**	**	**	**
Copper	36	36	100	230	mg/kg	NA	NA	7.0E+04	3.3E-03
Freon 11	1	48	2.1	0.00087	mg/kg	NA	NA	1.3E+03	6.7E-07
HMX	1	14	7.1	150	mg/kg	NA	NA	5.3E+04	2.8E-03
Lead	14	36	39	98	mg/kg	NA	NA	1.0E+03	9.8E-02
Mercury	3	36	8.3	0.29	mg/kg	*	*	*	*
Methylene chloride	27	48	56	0.0043	mg/kg	2.0E+01	2.2E-10	9.1E+03	4.7E-07
Nickel	35	36	97	32	mg/kg	**	**	**	**
PCB 1242	1	8	12	34	mg/kg	b	b	b	b
PCB 1248	1	8	12	52	mg/kg	b	b	b	b
PCB 1254	1	8	12	0.16	mg/kg	b	b	b	b
Silver	1	36	2.8	42	mg/kg	*	*	*	*
Thorium-228	1	1	100	0.34	pCi/g	**	**	**	**
Thorium-230	1	1	100	0.64	pCi/g	**	**	**	**
Thorium-232	14	14	100	0.51	pCi/g	**	**	**	**
Toluene	1	45	2.2	0.00062	mg/kg	NA	NA	5.2E+02	1.2E-06
Tritium	2	10	20	0.0602	pCi/g	**	**	**	**
Uranium-235 and Uranium-236	2	2	100	0.28	pCi/g	5.5E-01	5.1E-07	NA	NA
Vanadium	36	36	100	95	mg/kg	**	**	**	**
Total xylenes	2	45	4.4	0.0029	mg/kg	NA	NA	4.5E+03	NC
Zinc	36	36	100	1,400	mg/kg	NA	NA	5.6E+05	2.5E-03
						Risk Total =	5.6E-07	HI =	1.1E-01

Table 1-9. Substances reported in surface soil after the SWRI data cutoff (December 1991) at a frequency greater than 2%, and associated cancer risk and noncancer hazard. (Cont. Page 3 of 3)

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Cancer PRG ^a	Risk	Noncancer PRG ^a	Hazard quotient
OU7: Building 832 Canyon									
Cadmium	2	13	15	0.18	mg/kg	**	**	**	**
HMX	2	4	50	0.2	mg/kg	NA	NA	5.3E+04	3.8E-06
Nitrate (as NO ₃)	2	2	100	284	mg/kg	*	*	*	*
Selenium	1	13	7.7	1	mg/kg	**	**	**	**
						Risk Total =	NA	HI =	3.8E-06
OU8: Building 833									
Benzene	9	29	31	0.0089	mg/kg	1.4E+00	6.4E-09	2.4E+01	3.7E-04
Bis(2-ethylhexyl)phthalate	1	15	6.7	2.8	mg/kg	2.1E+02	1.3E-08	2.1E+04	1.3E-04
Bromacil	1	10	10	1.9	mg/kg	NA	NA	NA	NA
Ethylbenzene	1	29	3.4	0.012	mg/kg	NA	NA	5.8E+03	2.1E-06
p,p'-DDE	6	16	38	0.0073	mg/kg	1.3E+01	5.6E-10	NA	NA
p,p'-DDT	7	16	44	0.017	mg/kg	1.3E+01	1.3E-09	8.0E+02	2.1E-05
Phenanthrene	1	15	6.7	1.4	mg/kg	NA	NA	NA	NA
Pyrene	1	15	6.7	1.5	mg/kg	NA	NA	2.6E+04	5.8E-05
Total xylenes	1	30	3.3	0.047	mg/kg	NA	NA	4.5E+03	NC
						Risk Total =	2.7E-08	HI =	5.8E-04

Notes:

NA = Not applicable or not available.

NC = Not calculated.

PRG = Preliminary Remediation Goal.

HI = Hazard Index.

^a EPA Region IX Preliminary Remediation Goal (PRG) and result in similar units.

Industrial soil integrated PRG in units of mg/kg was used for nonradiological constituents.

Commercial soil PRG in units of pCi/g was used for radiological constituents.

Cancer PRG concentrations that equate to a 10⁻⁶ cancer risk.

Noncancer PRG concentrations that equate to a hazard quotient of 1 for noncarcinogenic concerns.

^b These constituents were considered in previous risk assessments and are shown on Table 1-20.**Notes on compound specific PRG:**

DDT: Noncancer PRG less than or equal to 100× the cancer PRG.

Xylenes: The m-xylene PRG was used. The PRG is based on the soil saturation equation and is not used in the hazard calculation.

* Naturally occurring substance; insufficient data to calculate background.

** Naturally occurring substance; below background concentrations. See Appendix A for analysis of background values.

Table 1-10. Substances reported in subsurface soil at all depths after the SWRI data cutoff (December 1991) at a frequency greater than 2%.

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Notes
OU4: HE Process Area						
Actinium-228	8	8	100	1.32	pCi/g	a
Bismuth-214	14	14	100	1.67	pCi/g	b
Lead-212	18	18	100	1.56	pCi/g	b
Lead-214	17	17	100	1.08	pCi/g	b
Potassium-40	17	17	100	19.7	pCi/g	b
Radium-224	1	1	100	2.63	pCi/g	a
Radium-225	1	1	100	2.04	pCi/g	a
Radium-228	4	4	100	1.54	pCi/g	a
Thallium-208	17	17	100	0.5	pCi/g	b
Thorium-232	18	18	100	1.18	pCi/g	b
Thorium-234	1	8	12	1.16	pCi/g	a
OU5: Building 850/Pits 3&5						
PCB 1254	1	24	4.2	96	mg/kg	c
OU6: Building 854						
Arsenic	5	5	100	1.6	mg/kg	b
Barium	5	5	100	72	mg/kg	b
Beryllium	5	5	100	0.89	mg/kg	b
Bromoform	9	288	3.1	0.003	mg/kg	d
Chromium	5	5	100	14	mg/kg	b
Cobalt	5	5	100	15	mg/kg	b
Copper	5	5	100	25	mg/kg	b
HMX	1	28	3.6	0.37	mg/kg	c
Methylene chloride	219	288	76	0.009	mg/kg	d

Table 1-10. Substances reported in subsurface soil at all depths after the SWRI data cutoff (December 1991) at a frequency greater than 2%. (Cont. Page 2 of 2)

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Notes
OU6: Building 854 (cont.)						
Nickel	4	5	80	13	mg/kg	b
Selenium	1	5	20	0.81	mg/kg	b
Thorium-228	3	3	100	0.99	pCi/g	a
Thorium-230	3	3	100	1.22	pCi/g	a
Thorium-232	6	6	100	0.61	pCi/g	b
Uranium-235 and Uranium-236	6	6	100	0.42	pCi/g	e
Vanadium	5	5	100	100	mg/kg	b
Zinc	5	5	100	36	mg/kg	b
OU7: Building 832 Canyon						
Cadmium	7	59	12	2.5	mg/kg	e
HMX	28	50	56	0.2	mg/kg	c
Mercury	2	59	3.4	0.15	mg/kg	b
Molybdenum	3	59	5.1	27	mg/kg	b
Nitrate (as NO ₃)	5	19	26	13.5	mg/kg	a
OU8: Building 833						
Benzene	5	100	5	0.0013	mg/kg	d
p,p'-DDE	1	23	4.3	0.006	mg/kg	c
p,p'-DDT	1	23	4.3	0.038	mg/kg	c
Building 845						
Thorium-232	10	10	100	0.49	pCi/g	b

^a Naturally occurring substance, insufficient data to calculate background.^b Naturally occurring substance, below background concentrations.^c Anthropogenic, but non-volatile, therefore no complete exposure pathway.^d Volatile compounds included in Table 1-18 if detected between the depths of 0.5 and 12 ft.^e Above background, but non-volatile, therefore no complete exposure pathway.

Table 1-11. Substances reported in ground water after the SWRI data cutoff (December 1991) at a frequency greater than 2%, and associated cancer risk and noncancer hazard.

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Cancer PRG ^a	Risk	Noncancer PRG ^a	Hazard quotient
OU2: Building 834									
Aluminum	17	303	5.6	6.1	mg/L	NA	NA	3.7E+01	1.6E-01
Mercury	15	307	4.9	0.51	µg/L	*	*	*	*
Nitrate (as NO ₃)	288	326	88	480	mg/L	NA	NA	1.0E+01	4.8E+01
Nitrite (as NO ₂)	4	24	17	8.9	mg/L	NA	NA	1.0E+00	8.9E+00
Radon-222	4	4	100	1,080	pCi/L	^b	^b	^b	^b
TBOS/TKEBS	45	169	27	7,300	mg/L	NA	NA	NA	NA
Risk Total =							NA	HI =	5.7E+01
OU3: Pit 6 Landfill									
Bismuth	1	1	100	0.27	µg/L	**	**	**	**
Lithium	1	1	100	43.3	µg/L	**	**	**	**
Molybdenum	17	39	44	47	µg/L	*	*	*	*
Nitrate (as NO ₃)	23	71	32	25.7	mg/L	*	*	*	*
Perchlorate	3	22	14	47.2	µg/L	NA	NA	1.8E+01	1.8E+00
Tetrahydrofuran	1	1	100	2	µg/L	NA	NA	3.1E+03	6.4E-04
Thorium	1	1	100	0.11	µg/L	**	**	**	**
Risk Total =							NA	HI =	1.8E+00
OU4: HE Process Area									
1,3-Dinitrobenzene	3	77	3.9	0.37	µg/L	NA	NA	3.7E+00	1.0E-01
2,6-Dinitrotoluene	6	147	4.1	1.2	µg/L	9.9E-02	1.2E-05	3.7E+01	3.2E-02
2-Amino-4,6-dinitrotoluene	4	67	6.0	0.71	µg/L	9.9E-02	7.2E-06	NA	
4-Amino-2,6-dinitrotoluene	47	78	60	24	µg/L	9.9E-02	2.4E-04	NA	
Bismuth	4	5	80	0.56	µg/L	**	**	**	**
Bismuth-214	2	5	40	21	pCi/L	**	**	**	**
Lead-212	1	15	6.7	48.1	pCi/L	**	**	**	**
Lead-214	2	9	22	96.3	pCi/L	**	**	**	**
Lithium	5	5	100	127	µg/L	**	**	**	**
Nitrate (as NO ₃)	226	338	67	421	mg/L	NA	NA	1.0E+01	4.2E+01

Table 1-11. Substances reported in ground water after the SWRI data cutoff (December 1991) at a frequency greater than 2%, and associated cancer risk and noncancer hazard. (Cont. Page 2 of 5)

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Cancer PRG ^a	Risk	Noncancer PRG ^a	Hazard quotient
OU4: HE Process Area (cont.)									
Perchlorate	42	103	41	50	µg/L	NA	NA	1.8E+01	2.8E+00
Phenolics	9	29	31	330	µg/L	NA	NA	2.2E+04	1.5E-02
Radium -28	7	25	28	5.12	pCi/L	b	b	b	b
Thorium	2	5	40	0.76	µg/L	**	**	**	**
Risk Total =							2.6E-04	HI =	4.5E+01
OU5: Building 850/Pits 3&5									
Benzoic Acid	3	74	4.1	120	µg/L	NA	NA	1.5E+05	8.0E-04
Bismuth	57	62	92	0.6	µg/L	NA	NA	NA	NA
Bismuth-214	1	4	25	19.1	pCi/L	**	**	**	**
Cesium-137	1	38	2.6	8.09	pCi/L	**	**	**	**
Iodine-129	1	1	100	34.3	pCi/L	**	**	**	**
Lead-210	2	2	100	54	pCi/L	**	**	**	**
Lead-214	1	4	25	20.4	pCi/L	**	**	**	**
Nitrate (as NO ₃)	369	439	84	195	mg/L	NA	NA	1.0E+01	1.9E+01
Perchlorate	2	19	10	8.7	µg/L	NA	NA	1.8E+01	4.8E-01
Thorium	20	63	32	1.19	µg/L	NA	NA	NA	NA
Thorium-230	248	510	49	91.5	pCi/L	b	b	b	b
Risk Total =							NA	HI =	1.9E+01
OU6: Building 854									
Aluminum	4	12	33	510	µg/L	*	*	*	*
Arsenic	14	17	82	53	µg/L	*	*	*	*
Barium	8	17	47	97	µg/L	*	*	*	*
Beryllium	2	8	25	92	µg/L	*	*	*	*
Bis(2-ethylhexyl)phthalate	1	14	7.1	8.6	µg/L	4.8E+00	1.8E-06	7.3E+02	1.2E-02
Chromium	7	17	41	3	µg/L	*	*	*	*
Cobalt	1	1	100	0.95	µg/L	*	*	*	*
Copper	2	15	13	530	µg/L	NA	NA	1.4E+03	3.8E-01

Table 1-11. Substances reported in ground water after the SWRI data cutoff (December 1991) at a frequency greater than 2%, and associated cancer risk and noncancer hazard. (Cont. Page 3 of 5)

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Cancer PRG ^a	Risk	Noncancer PRG ^a	Hazard quotient
OU6: Building 854 (cont.)									
Dimethylphthalate	1	14	7.1	9	µg/L	NA	NA	3.7E+05	2.4E-05
Iron	5	14	36	1.1	mg/L	*	*	*	*
Lead	4	17	24	5.8	µg/L	*	*	*	*
Lithium	1	1	100	52.9	µg/L	**	**	**	**
Mercury	2	16	12	0.4	µg/L	*	*	*	*
Molybdenum	1	1	100	6.4	µg/L	*	*	*	*
Nitrate (as NO ₃)	17	23	74	180	mg/L	NA	NA	1.0E+01	1.8E+01
Perchlorate	1	11	9.1	6.5	µg/L	NA	NA	1.8E+01	3.6E-01
Selenium	10	16	62	12	µg/L	*	*	*	*
Thorium-232	5	7	71	59	pCi/L	b	b	b	b
Toluene	3	104	2.9	14	µg/L	NA	NA	7.2E+02	1.9E-02
Tritium	5	30	17	410	pCi/L	6.7E+02	6.2E-07	NA	NA
Uranium-235 and Uranium-236	12	17	71	0.501	pCi/L	*	*	*	*
Vanadium	1	1	100	2.5	µg/L	*	*	*	*
Zinc	2	15	13	130	µg/L	NA	NA	1.1E+04	1.2E-02
Risk Total =							2.4E-06	HI =	1.9E+01
OU7: Building 832 Canyon									
Acetone	1	46	2.2	41	µg/L	NA	NA	6.1E+02	6.7E-02
Aluminum	28	72	39	29	mg/L	NA	NA	3.7E+01	7.8E-01
Cadmium	5	58	8.6	1.5	µg/L	*	*	*	*
cis-1,2-Dichloroethylene	26	388	6.7	8.6	µg/L	NA	NA	6.1E+01	1.4E-01
Hexavalent Chromium	10	16	62	8.6	µg/L	**	**	**	**
Mercury	2	58	3.4	0.36	µg/L	*	*	*	*
Molybdenum	9	16	56	240	µg/L	NA	NA	1.8E+02	1.3E+00
Nitrate (as NO ₃)	280	403	70	501	mg/L	NA	NA	1.0E+01	5.0E+01
Nitrite (as NO ₂)	31	344	9	7.2	µg/L	NA	NA	1.0E+00	7.2E+00
Perchlorate	11	27	41	22	µg/L	NA	NA	1.8E+01	1.2E+00

Table 1-11. Substances reported in ground water after the SWRI data cutoff (December 1991) at a frequency greater than 2%, and associated cancer risk and noncancer hazard. (Cont. Page 4 of 5)

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Cancer PRG ^a	Risk	Noncancer PRG ^a	Hazard quotient
OU7: Building 832 Canyon (cont.)									
Selenium	43	58	74	290	µg/L	NA	NA	1.8E+02	1.6E+00
Thorium-232	1	1	100	0.00264	pCi/L	b	b	b	b
Toluene	2	66	3	4.8	µg/L	NA	NA	7.2E+02	6.7E-03
						Risk Total =	NA	HI =	6.2E+01
OU8: Building 801									
Bismuth-214	3	7	43	113	pCi/L	**	**	**	**
Lead-214	5	8	62	126	pCi/L	**	**	**	**
Lithium	3	3	100	57.6	µg/L	**	**	**	**
Nitrate (as NO ₃)	3	3	100	47	mg/L	*	*	*	*
Potassium-40	1	9	11	192	pCi/L	**	**	**	**
Radium-228	1	14	7.1	0.68	pCi/L	b	b	b	b
Thorium-232	4	7	57	0.94	pCi/L	b	b	b	b
Zirconium-95	2	7	29	13	pCi/L	**	**	**	**
						Risk Total =	NA	HI =	NA
OU8: Building 802									
Arsenic	13	13	100	15.9	µg/L	*	*	*	*
Beryllium	1	15	6.7	0.37	µg/L	*	*	*	*
Bismuth	2	4	50	0.21	µg/L	**	**	**	**
Cadmium	2	13	15	0.53	µg/L	*	*	*	*
Chromium	7	14	50	2.9	µg/L	*	*	*	*
Lithium	4	4	100	48.2	µg/L	**	**	**	**
Molybdenum	4	8	50	7.1	µg/L	*	*	*	*
Nitrate (as NO ₃)	6	6	100	27	mg/L	*	*	*	*
Selenium	6	9	67	6.9	µg/L	*	*	*	*
Uranium-234 and Uranium-233	10	10	100	6.43	pCi/L	*	*	*	*

Table 1-11. Substances reported in ground water after the SWRI data cutoff (December 1991) at a frequency greater than 2%, and associated cancer risk and noncancer hazard. (Cont. Page 5 of 5)

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Cancer PRG ^a	Risk	Noncancer PRG ^a	Hazard quotient
OU8: Building 802 (cont.)									
Uranium-235 and Uranium-236	10	11	91	0.211	pCi/L	*	*	*	*
Uranium-238	11	11	100	4.2	pCi/L	*	*	*	*
Risk Total =						NA	HI =	NA	
OU8: Building 833									
Aluminum	1	2	50	2.5	mg/L	NA	NA	3.7E+01	6.8E-02
Benzene	1	10	10	1.1	µg/L	3.9E-01	2.8E-06	1.1E+01	1.0E-01
Carbon disulfide	1	6	17	0.7	µg/L	NA	NA	1.0E+03	7.0E-04
Nitrate (as NO ₃)	1	2	50	43	mg/L	*	*	*	*
Risk Total =						2.8E-06	HI =	1.7E-01	
OU8: Building 845									
Bismuth	3	3	100	0.31	µg/L	**	**	**	**
Lithium	3	3	100	135	µg/L	**	**	**	**
Molybdenum	11	18	61	57	µg/L	*	*	*	*
Nitrate (as NO ₃)	2	22	9.1	4.43	mg/L	*	*	*	*
Phenolics	5	9	56	16	µg/L	NA	NA	2.2E+04	7.3E-04
Thorium	1	3	33	0.2	µg/L	**	**	**	**
Risk Total =						NA	HI =	7.3E-04	

Notes:

HI = Hazard Index.

NA = Not applicable or not available.

^a EPA Region IX Preliminary Remediation Goal (PRG) and result in similar units.

Tap water PRG was used for nonradiological constituents.

Drinking water PRG was used for radiological constituents.

Cancer PRG concentrations that equate to a 10⁻⁶ cancer risk.^b Noncancer PRG concentrations that equate to a hazard quotient of 1 for noncarcinogenic concerns.

See discussion on radium and thorium in Appendix A.

Xylenes: The m-xylene PRG was used.

* Naturally occurring substance, below background concentrations.

** Naturally occurring substance, insufficient data to calculate background.

Risks and hazards calculated from highest reported historical concentrations immediately underlying the release sites; not at actual or potential receptor points.

Table 1-12. Substances reported in surface water after the SWRI data cutoff (December 1991) at a frequency greater than 2%.

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Notes
OU3: Pit 6 (Springs 7^a, sampled at BC6-13^a, and 15^a)						
None						
OU4: HE Process Area (Springs 4, 5^a, sampled at W-817-03A^a, and 14)						
Barium	8	19	42	290	µg/L	*
Cadmium	2	19	11	1.7	µg/L	b
Chromium	1	19	5.3	1.8	µg/L	*
Iron	2	19	11	120	µg/L	*
Lead	3	19	16	5.6	µg/L	*
Manganese	3	19	16	1.0	mg/L	*
Mercury	1	19	5.3	0.22	µg/L	*
Nitrate (as NO ₃)	28	29	97	487	mg/L	*
Nitrite (as NO ₂)	6	17	35	17	mg/L	*
Perchlorate	2	2	100	12	µg/L	c
Phenolics/phenol	1	6	17	26	µg/L	c
Uranium-234 and Uranium-233	12	12	100	16.1	pCi/L	d
Uranium-235 and Uranium-236	10	12	83	2.92	pCi/L	d
Uranium-238	12	12	100	15.4	pCi/L	d
OU5: Building 850/Pits 3&5 (Spring 6 and Well 8 Spring)						
Chromium	2	15	13	2.5	µg/L	*
Nitrate (as NO ₃)	11	12	92	90	mg/L	*
Selenium	4	16	25	4.8	µg/L	*
Thorium-232	4	4	100	0.005	pCi/L	d
Uranium-235 and Uranium-236	28	34	82	1.63	pCi/L	d
Vanadium	7	7	100	79	µg/L	*

**Table 1-12. Substances reported in surface water after the SWRI data cutoff (December 1991) at a frequency greater than 2%.
(Cont. Page 2 of 6)**

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Notes
OU6: Building 854 (Springs 10 and 11)						
Beryllium	1	7	14	0.55	µg/L	*
Cadmium	2	9	22	1.1	µg/L	*
Chromium	1	9	11	18	µg/L	*
Lead	2	9	22	23	µg/L	b
Tritium	2	10	20	163	pCi/L	*
Uranium 235 and Uranium 236	7	9	78	7.6	pCi/L	d
OU7: Building 832 Canyon (Spring 3)						
Arsenic	6	6	100	61	µg/L	*
Barium	6	6	100	105	µg/L	*
cis-1,2-DCE	1	10	10	2.2	µg/L	e
trans-1,2-DCE	1	11	9.1	0.53	µg/L	e
Magnesium	6	6	100	27	mg/L	*
Manganese	5	6	83	480	µg/L	*
Nitrate (as NO ₃)	7	7	100	53	mg/L	*
Selenium	4	6	67	16	µg/L	*
Thorium-232	1	1	100	0.0011	pCi/L	d
Uranium-234 and Uranium-233	7	8	88	15.4	pCi/L	d
Uranium-235 and Uranium-236	7	8	88	5.44	pCi/L	d
Uranium-238	8	8	100	16.5	pCi/L	d
Site 300 springs unrelated to release sites						
Spring 8						
Barium	3	4	75	94	µg/L	*
Chromium	1	4	25	15	µg/L	*
Manganese	1	3	33	50	µg/L	*

**Table 1-12. Substances reported in surface water after the SWRI data cutoff (December 1991) at a frequency greater than 2%.
(Cont. Page 3 of 6)**

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Notes
Spring 8 (cont.)						
Uranium-234 and Uranium-233	2	2	100	1.72	pCi/L	d
Uranium-235 and Uranium-236	1	2	50	0.07	pCi/L	d
Uranium-238	2	2	100	1.37	pCi/L	d
Spring 9						
Selenium	1	4	25	4.7	µg/L	*
TCE	1	5	20	7	µg/L	e
Uranium-234 and Uranium-233	4	5	80	0.49	pCi/L	d
Uranium-235 and Uranium-236	1	5	20	0.05	pCi/L	d
Uranium-238	4	5	80	0.32	pCi/L	d
Spring 12						
Barium	2	5	40	30	µg/L	*
1,2-DCE (total)	1	5	20	3.2	µg/L	e
Lead	1	5	20	2.5	µg/L	*
TCE	1	6	17	1.0	µg/L	e
Uranium-235 and Uranium-236	4	6	67	0.41	pCi/L	d
Spring 13						
Arsenic	2	3	67	18	µg/L	*
Lead	1	3	33	3.8	µg/L	*
Magnesium	3	3	100	33	mg/L	*
Nitrate (as NO ₃)	2	3	67	20.4	mg/L	*
Selenium	1	3	33	3.6	µg/L	*
Tritium	1	3	33	93.4	pCi/L	*
Uranium-234 and Uranium-233	3	3	100	2.26	pCi/L	d

**Table 1-12. Substances reported in surface water after the SWRI data cutoff (December 1991) at a frequency greater than 2%.
(Cont. Page 4 of 6)**

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Notes
Spring 13 (cont.)						
Uranium-235 and Uranium-236	3	3	100	0.22	pCi/L	d
Uranium-238	3	3	100	1.73	pCi/L	d
Spring 16						
Barium	4	5	80	130	µg/L	*
Nitrate (as NO ₃)	2	2	100	4,600	mg/L	*
Spring 17						
Cadmium	1	5	20	1.5	µg/L	*
Nitrate (as NO ₃)	4	4	100	23	mg/L	*
Selenium	1	5	20	3.2	µg/L	*
Uranium-234 and Uranium-233	4	4	100	2.06	pCi/L	d
Uranium-235 and Uranium-236	3	4	75	0.33	pCi/L	d
Uranium-238	4	4	100	1.47	pCi/L	d
Spring 18						
Arsenic	4	4	100	34	µg/L	*
Barium	2	4	50	110	µg/L	*
Cadmium	1	4	25	1.4	µg/L	*
Magnesium	4	4	100	190	mg/L	*
Manganese	4	4	100	5	mg/L	*
Nitrate (as NO ₃)	1	4	25	6.2	mg/L	*
Uranium-234 and Uranium-233	3	3	100	6.02	pCi/L	d
Uranium-235 and Uranium-236	3	3	100	0.38	pCi/L	d
Uranium-238	3	3	100	5.71	pCi/L	d
Zinc	1	4	25	0.8	mg/L	*
Spring 20						
Arsenic	4	4	100	50	µg/L	*

**Table 1-12. Substances reported in surface water after the SWRI data cutoff (December 1991) at a frequency greater than 2%.
(Cont. Page 5 of 6)**

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Notes
Spring 20 (cont.)	4	4	100	100	µg/L	*
Cadmium	1	4	25	2.0	µg/L	*
Lead	1	4	25	2.5	µg/L	*
Magnesium	4	4	100	25	mg/L	*
Manganese	2	4	50	510	µg/L	*
Nitrate (as NO ₃)	3	4	100	26	mg/L	*
Selenium	1	4	25	2.2	µg/L	*
Uranium-234 and Uranium-233	4	4	100	4.52	pCi/L	d
Uranium-235 and Uranium-236	4	4	100	0.62	pCi/L	d
Uranium-238	4	4	100	3.64	pCi/L	d
Spring 21						
Arsenic	3	3	100	66	µg/L	*
Barium	3	3	100	130	µg/L	*
Cadmium	1	3	33	2.3	µg/L	*
Chromium	1	3	33	1.8	µg/L	*
Lead	1	3	33	10	µg/L	*
Magnesium	3	3	100	13	mg/L	*
Manganese	2	3	67	580	µg/L	*
Nitrate (as NO ₃)	3	3	100	91	mg/L	*
Selenium	3	3	100	9.0	µg/L	*
Uranium-234 and Uranium-233	3	3	100	9.84	pCi/L	d
Uranium-235 and Uranium-236	3	3	100	1.46	pCi/L	d
Uranium-238	3	3	100	6.99	pCi/L	d
Spring 22						
Arsenic	2	2	100	16	µg/L	*
Barium	2	2	100	38	µg/L	*

Table 1-12. Substances reported in surface water after the SWRI data cutoff (December 1991) at a frequency greater than 2%. (Cont. Page 6 of 6)

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Notes
Spring 22 (cont.)	2	2	100	70	mg/L	*
Nitrate (as NO ₃)	2	2	100	7.0	mg/L	*
Uranium-234 and Uranium-233	2	2	100	7.23	pCi/L	^d
Uranium-235 and Uranium-236	2	2	100	0.294	pCi/L	^d
Uranium-238	2	2	100	6.55	pCi/L	^d
Spring 23^c						
Arsenic	2	2	100	47	µg/L	*
Barium	2	2	100	140	µg/L	*
Cadmium	1	2	50	1.9	µg/L	*
Magnesium	2	2	100	15	mg/L	*
Manganese	1	2	50	110	µg/L	*
Nitrate (as NO ₃)	2	2	100	87	mg/L	*
Selenium	2	2	100	6.4	µg/L	*
Uranium-234 and Uranium-233	2	2	100	10.5	pCi/L	^d
Uranium-235 and Uranium-236	2	2	100	4.29	pCi/L	^d
Uranium-238	2	2	100	8.43	pCi/L	^d

Note:

DCE = Dichloroethylene.

TCE = Trichloroethylene.

^a No surface flow^b Above background, but non-volatile, therefore no complete exposure pathway.^c Anthropogenic, but non-volatile, therefore no complete exposure pathway.^d See discussion of occurrence of uranium and thorium in ground water in Appendix A.^e Volatile compounds, included in Table 1-17.

* Naturally occurring substance, below background.

Table 1-13. Contaminants of potential concern^a reported in surface soil at a frequency greater than 2%, Preliminary Remediation Goals (PRGs), baseline cancer risk, and noncancer hazard.

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Cancer PRG ^b	Risk	Noncancer PRG ^b	Hazard quotient
OU2: Building 834									
Acetone	1	7	14	0.07	mg/kg	NA	NA	6.1E+03	1.2E-05
Beryllium	5	6	83	0.9	mg/kg	*	*	*	*
Freon 11	2	8	25	0.021	mg/kg	NA	NA	1.3E+03	1.6E-05
Freon 113	2	8	25	0.095	mg/kg	NA	NA	5.6E+03	NC
Trichloroethylene	1	8	12	0.19	mg/kg	6.1E+00	3.1E-08	NA	NA
Tritium	1	1	100	0.006	pCi/g	*	*	*	*
Uranium 234-and Uranium-233	1	1	100	1.2	pCi/g	6.9E+01	1.7E-08	NA	NA
Uranium-235 and Uranium-236	1	1	100	0.06	pCi/g	5.7E-01	1.1E-07	NA	NA
Uranium-238	1	1	100	0.12	pCi/g	7.3E+01	1.6E-09	NA	NA
Total xylenes	1	7	14	0.005	mg/kg	NA	NA	2.1E+02	NC
						Risk Total =	1.6E-07	HI =	2.8E-05
OU3: Pit 6									
Beryllium	6	7	86	0.8	mg/kg	*	*	*	*
Freon 11	2	7	29	0.009	mg/kg	NA	NA	1.3E+03	6.9E-06
HMX	1	6	17	0.014	mg/kg	NA	NA	5.3E+04	2.6E-07
RDX	1	6	17	0.044	mg/kg	2.7E+01	1.6E-09	NA	NA
Tritium	3	7	43	0.012	pCi/g	*	*	*	*
Uranium-234 and Uranium-233	6	6	100	1	pCi/g	*	*	*	*
Uranium-235 and Uranium-236	1	6	17	0.06	pCi/g	*	*	*	*
Uranium-238	6	6	100	1	pCi/g	*	*	*	*
						Risk Total =	1.6E-09	HI =	7.2E-06

Table 1-13. Contaminants of potential concern^a reported in surface soil at a frequency greater than 2%, Preliminary Remediation Goals (PRGs), baseline cancer risk, and noncancer hazard. (Cont. Page 2 of 5)

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Cancer PRG ^b	Risk	Noncancer PRG ^b	Hazard quotient
OU4: HE Process Area									
Acetone	1	19	5.3	0.076	mg/kg	NA	NA	6.1E+03	1.3E-05
Beryllium	23	29	79	0.9	mg/kg	*	*	*	*
Bromoform	2	41	4.9	0.0002	mg/kg	3.8E+02	5.3E-13	2.1E+04	9.5E-09
cis-1,2-Dichloroethene	2	25	8.0	0.0003	mg/kg	NA	NA	1.5E+02	2.0E-06
Freon 11	4	41	9.8	0.0007	mg/kg	NA	NA	1.3E+03	5.4E-07
HMX	14	51	27	3.95	mg/kg	NA	NA	5.3E+04	7.5E-05
Radium-226	6	6	100	0.62	pCi/g	*	*	*	*
Radium-228	2	2	100	0.96	pCi/g	*	*	*	*
RDX	9	39	23	0.18	mg/kg	2.7E+01	6.7E-09	3.3E+03	5.5E-05
Silver	1	29	3.4	5	mg/kg	**	**	**	**
Trichloroethylene	4	41	9.8	0.0007	mg/kg	6.1E+00	1.1E-10	7.9E+01	8.9E-06
Uranium-234 and Uranium-233	1	1	100	0.5	pCi/g	*	*	*	*
Uranium-238	1	1	100	0.5	pCi/g	*	*	*	*
						Risk Total =	6.8E-09	HI =	1.5E-04
OU5: Building 850/Pits 3&5									
Beryllium	36	50	72	1.1	mg/kg	*	*	*	*
HMX	1	30	3.3	2.4	mg/kg	NA	NA	5.3E+04	4.5E-05
PCB 1254	22	41	54	180	mg/kg	c	c	c	c
Radium-226	1	1	100	0.805	pCi/g	*	*	*	*
Tritium	5	14	36	0.724	pCi/g	4.5E+04	1.6E-11	NA	NA
Uranium-234 and Uranium-233	3	3	100	3.42	pCi/g	6.9E+01	5.0E-08	NA	NA
Uranium-235 and Uranium-236	55	56	98	0.53	pCi/g	5.7E-01	9.3E-07	NA	NA
Uranium-238	36	56	100	24.8	pCi/g	7.3E+01	3.4E-07	NA	NA
						Risk Total =	1.2E-06	HI =	4.5E-05

Table 1-13. Contaminants of potential concern^a reported in surface soil at a frequency greater than 2%, Preliminary Remediation Goals (PRGs), baseline cancer risk, and noncancer hazard. (Cont. Page 3 of 5)

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Cancer PRG ^b	Risk	Noncancer PRG ^b	Hazard quotient
OU6: Building 854									
Acetone	2	9	22	0.12	mg/kg	NA	NA	6.1E+03	2.0E-05
Beryllium	20	36	56	0.93	mg/kg	*	*	*	*
HMX	1	14	7.1	150	mg/kg	NA	NA	5.3E+04	2.8E-03
Methylene chloride	27	48	56	0.0043	mg/kg	2.0E+01	2.1E-10	9.1E+03	4.7E-07
PCB 1242	1	8	12	34	mg/kg	c	c	c	c
PCB 1248	1	8	12	52	mg/kg	c	c	c	c
PCB 1254	1	8	12	0.16	mg/kg	c	c	c	c
Silver	1	36	2.8	42	mg/kg	**	**	**	**
Trichloroethylene	3	57	5.3	0.0044	mg/kg	6.1E+00	7.2E-10	7.9E+01	5.6E-05
Tritium	2	10	20	0.0602	pCi/g	*	*	*	*
Uranium-234 and Uranium-233	2	2	100	1.01	pCi/g	6.9E+01	1.5E-08	NA	NA
Uranium-235 and Uranium-236	16	16	100	0.28	pCi/g	5.7E-01	4.9E-07	NA	NA
Uranium-238	16	16	100	1.08	pCi/g	6.9E+01	1.6E-08	NA	NA
Total xylenes	2	45	4.4	0.0029	mg/kg	NA	NA	2.1E+02	NC
Risk Total =							5.2E-07	HI =	2.9E-03
OU7: Building 832									
Beryllium	16	20	80	0.9	mg/kg	*	*	*	*
HMX	2	4	50	0.2	mg/kg	NA	NA	5.3E+04	3.8E-06
Methylene chloride	4	14	29	0.0024	mg/kg	2.0E+01	1.2E-10	9.1E+03	2.6E-07
Nitrate (as NO ₃)	2	2	100	284	mg/kg	**	**	**	**
Tritium	3	9	33	1.68	pCi/g	4.5E+04	3.7E-11	NA	NA
Uranium-234 and Uranium-233	1	1	100	1.2	pCi/g	*	*	*	*
Uranium-235 and Uranium-236	1	1	100	0.06	pCi/g	*	*	*	*
Uranium-238	1	1	100	0.12	pCi/g	*	*	*	*
Risk Total =							1.6E-10	HI =	4.E-06

Table 1-13. Contaminants of potential concern^a reported in surface soil at a frequency greater than 2%, Preliminary Remediation Goals (PRGs), baseline cancer risk, and noncancer hazard. (Cont. Page 4 of 5)

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Cancer PRG ^b	Risk	Noncancer PRG ^b	Hazard quotient
OU8: Building 833									
Acetone	2	21	9.5	0.1	mg/kg	NA	NA	6.1E+03	1.6E-05
Benzene	9	29	31	0.0089	mg/kg	1.4E+00	6.4E-09	2.4E+01	3.7E-04
Beryllium	7	18	39	1.1	mg/kg	*	*	*	*
Bis(2-ethylhexyl)phthalate	1	15	6.7	2.8	mg/kg	2.1E+02	1.3E-08	2.1E+04	1.3E-04
Ethylbenzene	1	29	3.4	0.012	mg/kg	NA	NA	2.3E+02	NC
Freon 11	3	34	8.8	0.044	mg/kg	NA	NA	1.3E+03	3.4E-05
Freon 113	2	32	6.3	0.043	mg/kg	NA	NA	5.6E+03	NC
Methylene chloride	23	44	52	0.13	mg/kg	2.0E+01	6.5E-09	9.1E+03	1.4E-05
p,p'-DDE	6	16	38	0.0073	mg/kg	1.3E+01	5.6E-10	NA	NA
p,p'-DDT	7	16	44	0.017	mg/kg	1.3E+01	1.3E-09	8.0E+02	2.1E-05
Phenanthrene	1	15	6.7	1.4	mg/kg	NA	NA	NA	NA
Pyrene	1	15	6.7	1.5	mg/kg	NA	NA	2.6E+04	5.8E-05
Toluene	18	29	62	0.023	mg/kg	NA	NA	5.2E+02	NC
1,1,1-Trichloroethane	3	34	8.8	0.005	mg/kg	NA	NA	1.4E+03	NC
Total xylenes	1	30	3.3	0.047	mg/kg	NA	NA	2.1E+02	NC
Risk Total =						2.8E-08	HI =	6.5E-04	

Footnotes appear on following page.

Table 1-13. Contaminants of potential concern^a reported in surface soil at a frequency greater than 2%, Preliminary Remediation Goals (PRGs), baseline cancer risk, and noncancer hazard. (Cont. Page 5 of 5)

Notes:

HI = Hazard Index.

NA = No PRG available.

NC = Not calculated, the PRG is based on the soil saturation equation and is not used in the hazard calculation.

Benzene: noncancer PRG less than or equal to 100X the cancer PRG.

Bromoform: Noncancer PRG less than or equal to 100X the cancer PRG.

DDT: Noncancer PRG less than or equal to 100X the cancer PRG.

1,2-Dichloroethylene (total): cis-1,2-Dichloroethylene PRG was used.

Ethylbenzene: The PRG is based on the soil saturation equation and is not used in the hazard calculation.

Freon 113: The PRG is based on the soil saturation equation and is not used in the hazard calculation.

PCBs: Noncancer PRG less than or equal to 100X the cancer PRG.

Toluene: The PRG is based on the soil saturation equation and is not used in the hazard calculation.

TCE: Noncancer PRG less than or equal to 100X the cancer PRG.

1,1,1-TCA: The PRG is based on the soil saturation equation and is not used in the hazard calculation.

Xylenes: The m-xylene PRG was used. The PRG is based on the soil saturation equation and is not used in the hazard calculation.

Tritium: Tritium was measured as pCi/L in soil moisture. Activity as pCi/g was calculated using soil moisture data

^a **Potential contaminants of concern were volatile and semivolatile compounds, uranium isotopes, tritium, HMX, RDX, phenolics, silver, nitrate/nitrite, TBOS/TKEBS, and perchlorate.**

^b **EPA Region IX Preliminary Remediation Goal and result in similar units.**

Industrial soil PRG was used for nonradiological constituents.

Commercial soil PRG was used for radiological constituents.

Cancer PRG concentrations that equate to a 10^{-6} cancer risk.

Noncancer PRG concentrations that equate to a hazard quotient of 1 for noncarcinogenic concerns.

^c **These constituents were considered in a previous risk assessment and are included in risks shown on Table 1-18.**

^{*} **Naturally occurring substance; below background concentrations.**

^{**} **Naturally occurring substance; insufficient data to calculate background.**

Table 1-14. Contaminants of potential concern (COPCs)^a reported in subsurface soil at all depths at a frequency greater than 2%.

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units
OU2: Building 834					
Benzene	27	129	21	0.0013	mg/kg
Chloroform	38	646	5.9	0.024	mg/kg
cis-1,2-DCE	7	61	12	0.02	mg/kg
Ethylbenzene	28	129	22	0.0035	mg/kg
Freon 11	15	646	2.3	0.2	mg/kg
Freon 113	25	598	4.2	0.004	mg/kg
HMX	1	18	5.6	0.0002	mg/kg
Methylene chloride	17	646	2.6	0.0034	mg/kg
RDX	2	18	11	0.02	mg/kg
PCE	82	663	12	0.09	mg/kg
Toluene	43	129	33	0.052	mg/kg
TCE	424	732	58	970	mg/kg
Total xylenes	31	81	38	0.017	mg/kg
OU3: Pit 6 Landfill					
Benzene	54	120	45	0.025	mg/kg
Beryllium	16	16	100	0.8	mg/kg
Chloroform	34	176	19	0.023	mg/kg
1,2-DCE (total)	10	176	5.7	0.0039	mg/kg
Ethylbenzene	12	120	10	0.0093	mg/kg
Freon 11	12	176	6.8	0.0046	mg/kg
Freon 113	26	164	16	0.0019	mg/kg
Methylene chloride	58	176	33	0.039	mg/kg
PCE	24	176	14	0.0036	mg/kg
Toluene	91	120	76	0.06	mg/kg
1,1,1-TCA	4	176	2.3	0.0007	mg/kg
TCE	34	176	19	0.032	mg/kg
Total xylenes	58	108	54	0.0094	mg/kg
OU4: HE Process Area					
Benzene	106	389	27	0.9	mg/kg
Beryllium	93	98	95	1.4	mg/kg
Chloroform	87	1,402	6.2	0.4	mg/kg
cis-1,2-DCE	68	615	11	0.026	mg/kg
Ethylbenzene	42	387	11	0.0006	mg/kg

Table 1-14. Contaminants of potential concern (COPCs)^a reported in subsurface soil at all depths at a frequency greater than 2%. (Cont. Page 2 of 4)

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units
OU4: HE Process Area (cont.)					
Freon 113	88	1,339	6.6	0.0031	mg/kg
Freon 12	52	1,321	3.9	0.0024	mg/kg
HMX	213	1,236	17	21	mg/kg
Methylene chloride	152	1,401	11	0.013	mg/kg
Radium 226	9	9	100	1.04	pCi/g
Radium 228	4	4	100	1.54	pCi/g
RDX	103	1,243	8.3	3.25	mg/kg
Silver	3	98	3.1	9	mg/kg
Tetrahydrofuran	9	9	100	1	mg/kg
Thallium	78	98	80	14	mg/kg
Toluene	166	387	43	0.003	mg/kg
TCE	133	1,402	9.5	33	mg/kg
Uranium-235	36	36	100	0.332	pCi/g
Uranium-238	36	36	100	6.92	pCi/g
Total xylenes	127	331	38	0.021	mg/kg
OU5: Building 850/Pits 3&5					
Beryllium	1	1	100	0.39	mg/kg
PCB 1254	1	24	4.2	96	mg/kg
Tritium	658	916	72	11,000,000	pCi/Lsm
Uranium-234 and Uranium-233	35	35	100	3.7	pCi/g
Uranium-235 and Uranium-236	94	126	75	0.5	pCi/g
Uranium-238	126	126	100	28.2	pCi/g
OU6: Building 854					
Beryllium	5	5	100	0.89	mg/kg
Bromoform	9	288	3.1	0.003	mg/kg
HMX	1	28	3.6	0.37	mg/kg
Methylene chloride	219	288	76	0.009	mg/kg
TCE	99	455	22	30.7	mg/kg
Uranium-234 and Uranium-233	6	6	100	1.52	pCi/g
Uranium-235 and Uranium-236	12	12	100	0.42	pCi/g
Uranium-238	12	12	100	1.8	pCi/g
OU7: Building 832 Canyon					
Beryllium	41	88	47	1.3	mg/kg

Table 1-14. Contaminants of potential concern (COPCs)^a reported in subsurface soil at all depths at a frequency greater than 2%. (Cont. Page 3 of 4)

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units
OU7: Building 832 Canyon (cont.)					
Freon 113	26	890	2.9	0.0016	mg/kg
HMX	28	50	56	0.2	mg/kg
Methylene chloride	343	919	37	0.0099	mg/kg
Nitrate (as NO ₃)	5	19	26	13.5	mg/kg
TCE	298	937	32	6.3	mg/kg
Tritium	16	138	12	5,370	pCi/Lsm
Uranium-235	6	14	43	0.094	pCi/g
Uranium-238	14	14	100	1.9	pCi/g
OU8: Building 801					
Benzene	2	6	33	0.001	mg/kg
Chloroform	2	16	12	0.0003	mg/kg
Ethylbenzene	2	6	33	0.0019	mg/kg
Freon 11	2	16	12	0.0003	mg/kg
Toluene	6	6	100	0.0017	mg/kg
TCE	2	16	12	0.057	mg/kg
Tritium	5	10	50	480	pCi/Lsm
Total xylenes	6	6	100	0.0016	mg/kg
OU8: Building 802					
Tritium	39	73	53	60,700	pCi/Lsm
OU8: Building 833					
Acetone	3	78	3.8	0.23	mg/kg
Benzene	5	100	5.0	0.0013	mg/kg
Beryllium	21	27	78	0.79	mg/kg
Chloroform	21	823	2.6	0.0008	mg/kg
Freon 113	46	812	5.7	0.0027	mg/kg
Freon 12	25	762	3.3	0.0008	mg/kg
Methylene chloride	79	835	9.5	0.047	mg/kg
p,p'-DDE	1	23	4.3	0.006	mg/kg
p,p'-DDT	1	23	4.3	0.038	mg/kg
Radium-226	6	7	86	0.9	pCi/g
Silver	1	27	3.7	1.2	mg/kg
Toluene	8	103	7.8	0.0052	mg/kg
TCE	383	860	44	1.5	mg/kg

Table 1-14. Contaminants of potential concern (COPCs)^a reported in subsurface soil at all depths at a frequency greater than 2%. (Cont. Page 4 of 4)

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units
OU8: Building 833 (cont.)					
Tritium	1	32	3.1	440	pCi/Lsm
Uranium 234 and Uranium 233	8	8	100	1	pCi/g
Uranium 238	8	8	100	1	pCi/g
OU8: Building 845					
HMX	5	12	42	0.054	mg/kg
Tritium	8	28	29	2000	pCi/Lsm
Uranium-234 and Uranium-233	10	10	100	1.1	pCi/g
Uranium-235	20	20	100	0.021	pCi/g
Uranium-238	30	30	100	1.2	pCi/g
OU8: Building 851					
cis-1,2-DCE	4	6	67	0.012	mg/kg
TCE	2	6	33	0.0003	mg/kg
Uranium-234 and Uranium-233	10	10	100	2.1	pCi/g
Uranium-235 and Uranium-236	2	10	20	0.3	pCi/g
Uranium-238	10	10	100	11	pCi/g

Notes:

DDE = Dichloro-diphenyl-dichloro-ethylene.

DDT = Dichloro-diphenyl-trichloro-ethane.

DCE = Dichloroethylene.

PCE = Tetrachloroethylene.

TCA = Trichloroethane.

TCE = Trichloroethylene.

^a Potential COCs were volatile and semivolatile compounds, uranium isotopes, tritium, HMX, RDX, beryllium, phenolics, silver, nitrate/nitrite, TBOS/TKEBS, and perchlorate.

Table 1-15. Volatile contaminants of potential concern reported in subsurface soil at a frequency greater than 2% at a depth of 0.5 to 12 ft, pathway specific Preliminary Remediation Goals (PRGs) for inhalation, baseline cancer risk, and noncancer hazard.

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Cancer PRG ^a	Risk	Noncancer PRG ^a	Hazard quotient
OU2: Building 834									
Benzene	6	38	16	0.0013	mg/kg	1.4E+00	9.3E-10	2.4E+01	5.4E-05
Chloroform	7	143	4.9	0.0088	mg/kg	5.2E-01	1.7E-08	1.5E+02	5.9E-05
cis-1,2-DCE	4	24	17	0.02	mg/kg	NA	NA	1.5E+02	1.3E-04
Ethylbenzene	12	38	32	0.0035	mg/kg	NA	NA	6.2E+03	5.6E-07
Freon 11	9	143	6.3	0.2	mg/kg	NA	NA	1.3E+03	1.5E-04
Freon 113	12	131	9.2	0.004	mg/kg	NA	NA	6.9E+04	5.8E-08
Methylene chloride	10	143	7	0.0034	mg/kg	2.1E+01	1.6E-10	1.1E+04	3.1E-07
PCE	35	151	23	14	mg/kg	2.2E+01	6.4E-07	1.9E+03	7.4E-03
Toluene	14	38	37	0.052	mg/kg	NA	NA	2.0E+03	2.6E-05
TCE	112	174	64	258	mg/kg	6.2E+00	4.2E-05	8.0E+01	3.2E+00
Total xylenes	14	26	54	0.017	mg/kg	NA	NA	4.5E+03	3.8E-06
						Risk Total =	4.3E-05	HI =	3.2E+00
OU3: Pit 6 Landfill									
Benzene	12	32	38	0.025	mg/kg	1.4E+00	1.8E-08	2.4E+01	1.1E-03
Chloroform	6	44	14	0.0022	mg/kg	5.2E-01	4.2E-09	1.5E+02	1.5E-05
1,2-DCE (total)	2	44	4.5	0.0039	mg/kg	NA	NA	1.5E+02	2.6E-05
Ethylbenzene	8	32	25	0.006	mg/kg	NA	NA	6.2E+03	9.7E-07
Freon 11	2	44	4.5	0.0004	mg/kg	NA	NA	1.3E+03	3.1E-07
Methylene chloride	10	44	23	0.0036	mg/kg	2.1E+01	1.7E-10	1.1E+04	3.3E-07
PCE	10	44	23	0.0022	mg/kg	2.2E+01	1.0E-10	1.9E+03	1.2E-06
Toluene	22	32	69	0.036	mg/kg	NA	NA	2.0E+03	1.8E-05
TCE	16	44	36	0.022	mg/kg	6.2E+00	3.6E-09	8.0E+01	2.7E-04
Total xylenes	14	28	50	0.0076	mg/kg	NA	NA	4.5E+03	1.7E-06
						Risk Total =	2.6E-08	HI =	1.4E-03

Table 1-15. Volatile contaminants of potential concern reported in subsurface soil at a frequency greater than 2% at a depth of 0.5 to 12 ft, pathway specific Preliminary Remediation Goals (PRGs) for inhalation, baseline cancer risk, and noncancer hazard. (Cont. Page 2 of 4)

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Cancer PRG ^a	Risk	Noncancer PRG ^a	Hazard quotient
OU4: HE Process Area									
Benzene	17	56	30	0.9	mg/kg	1.4E+00	6.4E-07	2.4E+01	3.8E-02
Chloroform	13	176	7.4	0.4	mg/kg	5.2E-01	7.7E-07	1.5E+02	2.7E-03
cis-1,2-DCE	14	60	23	0.0078	mg/kg	NA	NA	1.5E+02	5.2E-05
Ethylbenzene	3	54	5.6	0.0003	mg/kg	NA	NA	6.2E+03	4.8E-08
Freon 11	5	177	2.8	0.4	mg/kg	NA	NA	1.3E+03	3.1E-04
Freon 113	6	163	3.7	0.0016	mg/kg	NA	NA	6.9E+04	2.3E-08
Methylene chloride	11	175	6.3	0.0077	mg/kg	2.1E+01	3.7E-10	1.1E+04	7.0E-07
PCE	7	175	4	0.0034	mg/kg	2.2E+01	1.6E-10	1.9E+03	1.8E-06
Tetrahydrofuran	6	6	100	1	mg/kg	NA	NA	5.8E+08	1.7E-09
Toluene	18	54	33	0.002	mg/kg	NA	NA	2.0E+03	1.0E-06
TCE	21	175	12	0.051	mg/kg	6.2E+00	8.2E-09	8.0E+01	6.4E-04
Total xylenes	12	43	28	0.0028	mg/kg	NA	NA	4.5E+03	6.2E-07
						Risk Total =	1.4E-06	HI =	4.2E-02
OU5: Building 850/Pits 3&5									
Tritium	222	257	86	1180	pCi/g	4.5E+04	2.6E-08	NA	NA
						Risk Total =	2.6E-08	HI =	NA
OU6: Building 854									
Methylene chloride	97	120	81	0.009	mg/kg	2.1E+01	4.3E-10	1.1E+04	8.2E-07
TCE	18	130	14	30.7	mg/kg	6.2E+00	5.0E-06	8.0E+01	3.8E-01
						Risk Total =	5.0E-06	HI =	3.8E-01
OU7: Building 832 Canyon									
Methylene chloride	60	154	39	0.006	mg/kg	2.1E+01	2.9E-10	1.1E+04	5.5E-07
TCE	49	168	29	2.6	mg/kg	6.2E+00	4.2E-07	8.0E+01	3.2E-02
Tritium	5	57	8.8	1.36	pCi/g	4.5E+04	3.0E-11	NA	NA
						Risk Total =	4.2E-07	HI =	3.2E-02

Table 1-15. Volatile contaminants of potential concern reported in subsurface soil at a frequency greater than 2% at a depth of 0.5 to 12 ft, pathway specific Preliminary Remediation Goals (PRGs) for inhalation, baseline cancer risk, and noncancer hazard. (Cont. Page 3 of 4)

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Cancer PRG ^a	Risk	Noncancer PRG ^a	Hazard quotient
OU8: Building 801									
Benzene	2	4	50	0.001	mg/kg	1.4E+00	7.1E-10	2.4E+01	4.2E-05
Chloroform	2	4	50	0.0003	mg/kg	5.2E-01	5.8E-10	1.5E+02	2.0E-06
Ethylbenzene	2	4	50	0.0019	mg/kg	NA	NA	6.2E+03	3.1E-07
Freon 11	2	4	50	0.0003	mg/kg	NA	NA	1.3E+03	2.3E-07
Toluene	4	4	100	0.0017	mg/kg	NA	NA	2.0E+03	8.5E-07
TCE	2	4	50	0.0004	mg/kg	6.2E+00	6.5E-11	8.0E+01	5.0E-06
Tritium	1	4	25	0.0768	pCi/g	4.5E+04	1.7E-12	NA	NA
Total xylenes	4	4	100	0.0016	mg/kg	NA	NA	4.5E+03	3.6E-07
						Risk Total =	1.4E-09	HI =	5.0E-05
OU8: Building 802									
Tritium	7	9	78	4.31	pCi/g	4.5E+04	9.6E-11	NA	NA
						Risk Total =	9.6E-11	HI =	NA
OU8: Building 833									
Acetone	2	32	6.3	0.23	mg/kg	NA	NA	6.4E+03	3.6E-05
Benzene	5	44	11	0.0013	mg/kg	1.4E+00	9.3E-10	2.4E+01	5.4E-05
Chloroform	6	188	3.2	0.0008	mg/kg	5.2E-01	1.5E-09	1.5E+02	5.3E-06
1,3-DCE	5	212	2.4	0.0004	mg/kg	NA	NA	1.4E+02	2.9E-06
Freon 11	4	188	2.1	0.006	mg/kg	NA	NA	1.3E+03	4.6E-06
Freon 12	8	173	4.6	0.0005	mg/kg	NA	NA	3.1E+02	1.6E-06
Freon 113	12	182	6.6	0.0021	mg/kg	NA	NA	6.9E+04	3.0E-08
Methylene chloride	37	200	18	0.047	mg/kg	2.1E+01	2.2E-09	1.1E+04	4.3E-06
Toluene	8	44	18	0.0052	mg/kg	NA	NA	2.0E+03	2.6E-06
TCE	79	188	41	0.15	mg/kg	6.2E+00	2.4E-08	8.0E+01	1.9E-03
Tritium	1	13	7.7	0.0528	pCi/g	4.5E+04	1.2E-12	NA	NA
Total xylenes	2	44	4.5	0.015	mg/kg	NA	NA	4.5E+03	3.3E-06
						Risk Total =	2.9E-08	HI =	2.0E-03

Table 1-15. Volatile contaminants of potential concern reported in subsurface soil at a frequency greater than 2% at a depth of 0.5 to 12 ft, pathway specific Preliminary Remediation Goals (PRGs) for inhalation, baseline cancer risk, and noncancer hazard. (Cont. Page 4 of 4)

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Cancer PRG ^a	Risk	Noncancer PRG ^a	Hazard quotient
OU8: Building 845									
Tritium	2	2	100	0.06	pCi/g	45000	1.3E-12	NA	NA
						Risk Total =	1.3E-12	HI =	NA
OU8: Building 851									
cis-1,2-DCE	4	6	67	0.012	mg/kg	NA	NA	1.5E+02	8.0E-05
TCE	2	6	33	0.0003	mg/kg	6.2E+00	4.8E-11	8.0E+01	3.8E-06
						Risk Total =	4.8E-11	HI =	8.4E-05

Notes:

DCE = Dichloroethylene.

HI = Hazard Index.

NA = No PRG available.

PRG = Preliminary Remediation Goal.

PCE = Tetrachloroethylene.

TCE = Trichloroethylene.

^a EPA Region IX and result in similar units.

Industrial soil pathway specific PRG for inhalation was used for nonradiological constituents.

Commercial soil PRG was used for radiological constituents, this includes ingestion, dermal absorption and inhalation pathways.

Cancer PRG concentrations that equate to a 10⁻⁶ cancer risk.

Noncancer PRG concentrations that equate to a hazard quotient of 1 for noncarcinogenic concerns.

Notes on compound specific PRGs:

1,2-DCE (total): cis-1,2-DCE PRG was used.

Xylenes: The m-xylene PRG was used. The PRG is based on the soil saturation equation and is not used in the hazard calculation.

Table 1-16. Contaminants of potential concern^a reported in ground water at a frequency greater than 2%, Preliminary Remediation Goals (PRGs), baseline cancer risk, and noncancer hazard.

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Cancer PRG ^b	Risk	Noncancer PRG ^b	Hazard quotient
OU2: Building 834									
Acetone	1	13	7.7	55	µg/L	NA	NA	6.1E+02	9.0E-02
Chloroform	31	1,212	2.6	950	µg/L	1.6E-01	5.9E-03	6.1E+01	1.6E+01
cis-1,2-DCE	177	749	24	540,000	µg/L	NA	NA	6.1E+01	8.8E+03
Nitrate (as NO ₃)	288	326	88	480	mg/L	NA	NA	1.0E+01	4.8E+01
Nitrite (as NO ₂)	4	24	17	8.9	mg/L	NA	NA	1.0E+00	8.9E+00
TBOS/TKEBS	45	169	27	7,300	mg/L	NA	NA	NA	NA
PCE	207	1,212	17	10,000	µg/L	1.1E+00	9.1E-03	2.5E+02	4.0E+01
Toluene	8	320	2.5	62	µg/L	NA	NA	7.2E+02	8.6E-02
1,1,1-TCA	27	1,212	2.2	33,000	µg/L	NA	NA	7.9E+02	4.2E+01
TCE	939	1,214	77	800,000	µg/L	1.6E+00	5.0E-01	3.7E+01	2.2E+04
						Risk Total =	5.2E-01	HI =	3.1E+04
OU3: Pit 6 Landfill									
Bis(2-ethylhexyl)phthalate	7	79	8.9	70	µg/L	4.8E+00	1.5E-05	7.3E+02	9.6E-02
Butylbenzylphthalate	2	47	4.3	78	µg/L	NA	NA	7.3E+03	1.1E-02
Carbon disulfide	10	235	4.3	3	µg/L	NA	NA	1.0E+03	3.0E-03
Chloroform	33	918	3.6	14	µg/L	1.6E-01	8.8E-05	6.1E+01	2.3E-01
1,2-DCA	20	918	2.2	1.7	µg/L	1.2E-01	1.4E-05	1.7E+01	1.0E-01
1,2-DCE (total)	42	756	5.6	11	µg/L	NA	NA	6.1E+01	1.8E-01
Ethylbenzene	9	356	2.5	7.3	µg/L	NA	NA	1.3E+03	5.6E-03
Methylene chloride	19	919	2.1	160	µg/L	4.3E+00	3.7E-05	1.6E+03	1.0E-01
Nitrate (as NO ₃)	23	71	32	25.7	mg/L	*	*	*	*
Nitrite (as NO ₂)	13	99	13	0.36	mg/L	NA	NA	1.0E+00	3.6E-01

Table 1-16. Contaminants of potential concern^a reported in ground water at a frequency greater than 2%, Preliminary Remediation Goals (PRGs), baseline cancer risk, and noncancer hazard. (Cont. Page 2 of 8)

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Cancer PRG ^b	Risk	Noncancer PRG ^b	Hazard quotient
OU3: Pit 6 Landfill (Cont.)									
Perchlorate	3	22	14	47.2	µg/L	NA	NA	1.8E+01	2.6E+00
Phenolics	32	263	12	90	µg/L	NA	NA	2.2E+04	4.1E-03
Silver	11	365	3.0	3.5	mg/L	NA	NA	1.8E-01	1.9E+01
PCE	52	918	5.7	3.2	µg/L	1.1E+00	2.9E-06	2.5E+02	1.3E-02
Tetrahydrofuran	1	1	100	2	µg/L	NA	NA	3.1E+03	6.5E-04
Toluene	28	356	7.9	17	µg/L	NA	NA	7.2E+02	2.4E-02
1,1,1-TCA	21	919	2.3	13	µg/L	NA	NA	7.9E+02	1.7E-02
TCE	281	918	31	250	µg/L	1.6E+00	1.6E-04	3.7E+01	6.8E+00
Tritium	62	356	17	1,600	pCi/L	6.7E+02	2.4E-06	NA	NA
Uranium-234 and Uranium-233	357	373	96	15.4	pCi/L	c	c	c	c
Uranium-235 and Uranium-236	91	374	24	1.75	pCi/L	c	c	c	c
Uranium-238	348	375	93	14.7	pCi/L	c	c	c	c
Total xylenes	28	306	9.2	15	µg/L	NA	NA	1.4E+03	1.1E-02
						Risk Total =	3.2E-04	HI =	2.9E+01
OU4: HE Process Area									
Beryllium	23	788	2.9	18	µg/L	NA	NA	7.3E+01	2.5E-01
Carbon disulfide	12	153	7.8	46	µg/L	NA	NA	1.0E+03	4.6E-02
Chloroform	118	2,125	5.6	5.8	µg/L	1.6E-01	3.6E-05	6.1E+01	9.5E-02
1,1-DCE	95	2,124	4.5	4.7	µg/L	4.6E-02	1.0E-04	5.5E+01	8.6E-02
1,2-DCE (total)	38	1,594	2.4	13	µg/L	NA	NA	6.1E+01	2.1E-01
1,3-Dinitrobenzene	3	67	4.5	0.37	µg/L	NA	NA	3.7E+00	1.0E-01
2,6-Dinitrotoluene	6	147	4.1	1.2	µg/L	9.9E-02	1.2E-05	3.7E+01	3.2E-02
2-Amino-4,6-dinitrotoluene	4	67	6.0	0.71	µg/L	NA	NA	NA	NA

Table 1-16. Contaminants of potential concern^a reported in ground water at a frequency greater than 2%, Preliminary Remediation Goals (PRGs), baseline cancer risk, and noncancer hazard. (Cont. Page 3 of 8)

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Cancer PRG ^b	Risk	Noncancer PRG ^b	Hazard quotient
OU4: HE Process Area (Cont.)									
4-Amino-2,6-dinitrotoluene	47	78	60	24	µg/L	NA	NA	NA	NA
HMX	107	1,937	5.5	67	µg/L	NA	NA	1.8E+03	3.7E-02
Nitrate (as NO ₃)	226	338	67	421	mg/L	NA	NA	1.0E+01	4.2E+01
Nitrite (as NO ₂)	20	246	8.1	27	µg/L	NA	NA	1.0E+00	2.7E+01
Perchlorate	42	103	41	50	µg/L	NA	NA	1.8E+01	2.8E+00
Phenolics	9	29	31	330	µg/L	NA	NA	2.2E+04	1.5E-02
RDX	382	1,959	20	350	µg/L	6.1E-01	5.7E-04	1.1E+02	3.2E+00
Silver	24	735	3.3	20	µg/L	NA	NA	1.8E+02	1.1E-01
Tetrahydrofuran	1	1	100	8	µg/L	NA	NA	3.1E+03	2.6E-03
Toluene	26	687	3.8	230	µg/L	NA	NA	7.2E+02	3.2E-01
TCE	1,040	2,148	48	1,000	µg/L	1.6E+00	6.2E-04	3.7E+01	2.7E+01
Tritium	58	267	22	940	pCi/L	6.7E+02	1.4E-06	NA	NA
Uranium 234-and Uranium-233	57	58	98	58.6	pCi/L	c	c	c	c
Uranium-235 and Uranium-236	49	68	72	4.8	pCi/L	c	c	c	c
Uranium-238	54	59	92	56.9	pCi/L	c	c	c	c
Total xylenes	8	383	2.1	17	µg/L	NA	NA	1.4E+03	1.2E-02
						Risk Total =	1.3E-03	HI =	1.0E+02
OU5: Building 850/Pits 3 & 5									
Carbon disulfide	5	220	2.3	9	µg/L	NA	NA	1.0E+03	9.0E-03
1,1-DCE	108	1,934	5.6	11	µg/L	4.6E-02	2.4E-04	5.5E+01	2.0E-01
Nitrate (as NO ₃)	369	439	84	195	mg/L	NA	NA	1.0E+01	2.0E+01
Nitrite (as NO ₂)	29	210	14	0.43	mg/L	NA	NA	1.0E+00	4.3E-01
Perchlorate	2	19	10	8.7	µg/L	NA	NA	1.8E+01	4.8E-01

Table 1-16. Contaminants of potential concern^a reported in ground water at a frequency greater than 2%, Preliminary Remediation Goals (PRGs), baseline cancer risk, and noncancer hazard. (Cont. Page 4 of 8)

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Cancer PRG ^b	Risk	Noncancer PRG ^b	Hazard quotient
OU5: Building 850/Pits 3 & 5 (cont.)									
Phenolics	55	497	11	460	µg/L	NA	NA	2.2E+04	2.1E-02
Silver	33	1,015	3.3	60	µg/L	NA	NA	1.8E+02	3.3E-01
Toluene	17	508	3.3	5.1	µg/L	NA	NA	7.2E+02	7.1E-03
TCE	290	1,934	15	24	µg/L	1.6E+00	1.5E-05	3.7E+01	6.5E-01
Tritium	4,211	6,379	66	2,660,000	pCi/L	6.7E+02	4.0E-03	NA	NA
Uranium-234 and Uranium-233	1,865	1,997	93	69.3	pCi/L	1.1E+00	6.3E-05	NA	NA
Uranium-235 and Uranium-236	1,208	2,248	54	5	pCi/L	1.1E+00	4.6E-06	NA	NA
Uranium-238	1,878	2,037	92	187	pCi/L	1.1E+00	1.7E-04	NA	NA
Total xylenes	19	293	6.5	10	µg/L	NA	NA	1.4E+03	7.2E-03
						Risk Total =	1.2E-02	HI =	2.3E+01
OU6: Building 854									
Beryllium	2	8	25	92	µg/L	NA	NA	7.3E+01	1.3E+00
Bis(2-ethylhexyl)phthalate	1	14	7.1	8.6	µg/L	4.8E+00	1.8E-06	7.3E+02	1.2E-02
Dimethylphthalate	1	14	7.1	9	µg/L	NA	NA	3.7E+05	2.4E-05
Nitrate (as NO ₃)	17	23	74	180	mg/L	NA	NA	1.0E+01	1.8E+01
Perchlorate	1	11	9.1	6.5	µg/L	NA	NA	1.8E+01	3.6E-01
Phenolics	1	1	100	9	µg/L	NA	NA	2.2E+04	4.1E-04
Toluene	3	104	2.9	14	µg/L	NA	NA	7.2E+02	1.9E-02
TCE	77	124	62	2,900	µg/L	1.6E+00	1.8E-03	3.7E+01	7.8E+01
Tritium	5	30	17	410	pCi/L	6.7E+02	6.2E-07	NA	NA
Uranium-234 and Uranium-233	13	17	76	31.9	pCi/L	1.1E+00	2.9E-05	NA	NA
Uranium-235 and Uranium-236	12	17	71	0.501	pCi/L	*	*	*	*
Uranium-238	16	17	94	10.6	pCi/L	1.1E+00	9.6E-06	NA	NA
						Risk Total =	1.9E-03	HI =	9.8E+01

Table 1-16. Contaminants of potential concern^a reported in ground water at a frequency greater than 2%, Preliminary Remediation Goals (PRGs), baseline cancer risk, and noncancer hazard. (Cont. Page 5 of 8)

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Cancer PRG ^b	Risk	Noncancer PRG ^b	Hazard quotient
OU7: Building 832 Canyon									
Acetone	1	46	2.2	41	µg/L	NA	NA	6.1E+02	6.7E-02
Beryllium	2	16	12	2	µg/L	*	*	*	*
Chloroform	15	615	2.4	30	µg/L	1.6E-01	1.9E-04	6.1E+01	4.9E-01
cis-1,2-DCE	26	388	6.7	8.6	µg/L	NA	NA	6.1E+01	1.4E-01
Nitrate (as NO ₃)	280	403	70	501	mg/L	NA	NA	1.0E+01	5.0E+01
Nitrite (as NO ₂)	31	344	9.0	7.2	mg/L	NA	NA	1.0E+00	7.2E+00
Perchlorate	11	27	41	22	µg/L	NA	NA	1.8E+01	1.2E+00
PCE	14	615	2.3	10	µg/L	1.1E+00	9.1E-06	2.5E+02	1.2E+00
Toluene	2	66	3.0	4.8	µg/L	NA	NA	7.2E+02	6.7E-03
TCE	403	615	66	30,000	µg/L	1.6E+00	1.9E-02	3.7E+01	8.1E+02
Tritium	2	63	3.2	300	pCi/L	6.7E+02	4.5E-07	2.5E+02	1.2E+00
Uranium-234 and Uranium-233	29	30	97	52.8	pCi/L	c	c	c	c
Uranium-235 and Uranium-236	25	30	83	3.67	pCi/L	c	c	c	c
Uranium-238	29	30	97	38.5	pCi/L	c	c	c	c
Risk Total =							1.9E-02	HI =	8.7E+02
OU8: Building 801									
Acetone	5	68	7.4	14	µg/L	NA	NA	6.1E+02	2.3E-02
Chloroform	34	126	27	2.4	µg/L	1.6E-01	1.5E-05	6.1E+01	3.9E-02
1,2-DCA	42	126	33	5	µg/L	1.2E-01	4.2E-05	1.7E+01	2.9E-01
Ethylbenzene	3	77	3.9	2.1	µg/L	NA	NA	1.3E+03	1.6E-03
Nitrate (as NO ₃)	3	3	100	47	mg/L	*	*	*	*
Nitrite (as NO ₂)	2	15	13	31 ^d	mg/L	NA	NA	1.0E+00	3.1E+01
Silver	1	46	2.2	0.5	µg/L	NA	NA	1.8E+02	2.8E-03

Table 1-16. Contaminants of potential concern^a reported in ground water at a frequency greater than 2%, Preliminary Remediation Goals (PRGs), baseline cancer risk, and noncancer hazard. (Cont. Page 6 of 8)

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Cancer PRG ^b	Risk	Noncancer PRG ^b	Hazard quotient
OU8: Building 801 (cont.)									
Toluene	6	77	7.8	4	µg/L	NA	NA	7.2E+02	5.6E-03
TCE	104	126	82	6	µg/L	1.6E+00	3.7E-06	3.7E+01	1.6E-01
Tritium	17	174	9.8	600	pCi/L	6.7E+02	9.0E-07	NA	NA
Uranium-234 and Uranium-233	60	62	97	8.79	pCi/L	*	*	*	*
Uranium-235 and Uranium-236	51	69	74	0.5	pCi/L	*	*	*	*
Uranium-238	60	62	97	5.84	pCi/L	*	*	*	*
Total xylenes	7	69	10	7.4	µg/L	NA	NA	1.4E+03	5.3E-03
Risk Total =						6.1E-05	HI =	3.2E+01	
OU8: Building 802									
Beryllium	1	15	6.7	0.37	µg/L	*	*	*	*
Nitrate (as NO ₃)	6	6	100	27	mg/L	*	*	*	*
Tritium	153	284	54	7,960	pCi/L	6.7E+02	1.2E-05	NA	NA
Uranium-234 and Uranium-233	10	10	100	6.43	pCi/L	*	*	*	*
Uranium-235 and Uranium-236	10	11	91	0.211	pCi/L	*	*	*	*
Uranium-238	11	11	100	4.2	pCi/L	*	*	*	*
Risk Total =						1.2E-05	HI =	NA	
OU8: Building 833									
Benzene	1	10	10	1.1	µg/L	3.9E-01	2.8E-06	NA	NA
Carbon disulfide	1	6	17	0.7	µg/L	NA	NA	1.0E+03	7.0E-04
cis-1,2-DCE	5	62	8.1	58	µg/L	NA	NA	6.1E+01	9.5E-01
Nitrate (as NO ₃)	1	2	50	43	mg/L	*	*	*	*
Toluene	3	10	30	17	µg/L	NA	NA	7.2E+02	2.4E-02
TCE	22	108	20	2,100	µg/L	1.6E+00	1.3E-03	3.7E+01	5.7E+01
Risk Total =						1.3E-03	HI =	5.8E+01	

Table 1-16. Contaminants of potential concern^a reported in ground water at a frequency greater than 2%, Preliminary Remediation Goals (PRGs), baseline cancer risk, and noncancer hazard. (Cont. Page 7 of 8)

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Cancer PRG ^b	Risk	Noncancer PRG ^b	Hazard quotient
OU8: Building 845									
Carbon disulfide	1	33	3.0	2	µg/L	NA	NA	1.0E+03	2.0E-03
Nitrate (as NO ₃)	2	22	9.1	4.43	mg/L	*	*	*	*
Phenolics	5	9	56	16	µg/L	NA	NA	2.2E+04	7.3E-04
Silver	7	48	15	2.1	µg/L	NA	NA	1.8E+02	1.2E-02
Toluene	1	39	2.6	1	µg/L	NA	NA	7.2E+02	1.4E-03
Uranium-234 and Uranium-233	53	60	88	4.6	pCi/L	1.1E+00	4.2E-06	NA	NA
Uranium-235 and Uranium-236	20	60	33	0.36	pCi/L	1.1E+00	3.3E-07	NA	NA
Uranium-238	49	61	80	1.3	pCi/L	1.1E+00	1.2E-06	NA	NA
						Risk Total =	7.3E-06	HI =	1.6E-02
Building 851									
Acetone	2	26	7.7	11	µg/L	NA	NA	6.1E+02	1.8E-02
Benzene	1	28	3.6	2	µg/L	3.9E-01	5.1E-06	1.1E+01	1.8E-01
Freon 113	2	31	6.5	1.1	µg/L	NA	NA	5.9E+04	1.9E-05
PCE	1	32	3.1	1.7	µg/L	1.1E+00	1.6E-06	2.5E+02	6.8E-03
Tetrahydrofuran	1	1	100	30	µg/L	NA	NA	3.1E+03	9.7E-03
Toluene	3	28	11	3	µg/L	NA	NA	7.2E+02	4.2E-03
1,1,1-TCA	1	32	3.1	0.8	µg/L	NA	NA	7.9E+02	1.0E-03
TCE	1	32	3.1	2.7	µg/L	1.6E+00	1.7E-06	3.7E+01	7.3E-02
Tritium	2	88	2.3	261	pCi/L	*	*	*	*
Uranium-234 and Uranium-233	28	39	72	2.4	pCi/L	1.1E+00	2.2E-06	NA	NA
Uranium-235 and Uranium-236	22	59	37	0.11	pCi/L	1.1E+00	1.0E-07	NA	NA
Uranium-238	36	47	77	1.3	pCi/L	1.1E+00	1.2E-06	NA	NA
Total xylenes	1	27	3.7	3	µg/L	NA	NA	1.4E+03	2.1E-03
						Risk Total =	1.2E-05	HI =	3.0E-01

Notes and footnotes appear on following page.

Table 1-16. Potential contaminants of concern^a reported in ground water at a frequency greater than 2%, Preliminary Remediation Goals (PRGs), baseline cancer risk, and noncancer hazard. (Cont. Page 8 of 8)

Notes:

DCA = Dichloroethane.

DCE = Dichloroethylene.

HI = Hazard Index.

NA = No PRG available.

PCE = Tetrachloroethylene.

TCA = Trichloroethane.

TCE = Trichloroethylene.

^a Potential COCs were volatile and semivolatile compounds, uranium isotopes, tritium, HMX, RDX, phenolics, silver, nitrate/nitrite, TBOS/TKEBS, and perchlorate.

^b EPA Region IX Preliminary Remediation Goal and result in similar units.

^c See discussion in Appendix A concerning natural occurrences of uranium.

^d Extreme outlier; not substantiated by other data.

* Below background concentrations.

Tap water PRG was used for nonradiological constituents.

The drinking water PRG was used for radiological constituents.

Cancer PRG concentrations that equate to a 10^{-6} cancer risk.

Noncancer PRG concentrations that equate to a hazard quotient of 1 for noncarcinogenic concerns.

Notes on compound specific PRGs:

Benzene: noncancer PRG less than or equal to 100× the cancer PRG.

1,2-DCE (total): cis-1,2-DCE PRG was used.

TCE: noncancer PRG less than or equal to 100X the cancer PRG.

Risks and hazards calculated from highest historic concentrations reported, immediately beneath the release sites; not at actual or potential receptor points.

Table 1-17. Contaminants of potential concern^a reported in surface water at a frequency greater than 2%, Preliminary Remediation Goals (PRGs), baseline cancer risk, and noncancer hazard.

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Cancer PRG ^b	Risk	Noncancer PRG ^b	Hazard quotient
OU3: Pit 6 Landfill (Spring 7^c, sampled at BC6-13^c)									
Chloroform	1	23	4.3	5.1	µg/L	1.6E-01	3.2E-05	6.1E+01	8.4E-02
1,2-DCA	2	23	8.7	3.5	µg/L	1.2E-01	2.9E-05	1.7E+01	2.1E-01
cis-1,2-DCE	11	13	85	12	µg/L	NA	NA	6.1E+01	2.0E-01
trans-1,2-DCE	12	14	80	33	µg/L	NA	NA	1.2E+02	2.8E-01
Methylene chloride	1	23	4.3	8.9	µg/L	4.3E+00	2.1E-06	1.6E+03	5.6E-03
PCE	5	23	22	1.4	µg/L	1.1E+00	1.3E-06	2.5E+02	5.6E-03
Toluene	1	13	7.7	0.9	µg/L	NA	NA	7.2E+02	1.3E-03
TCE	22	23	96	110	µg/L	1.6E+00	6.9E-05	3.7E+01	3.0E+00
Total xylenes	1	13	7.7	1.6	µg/L	NA	NA	1.4E+03	1.1E-03
						Risk Total =	1.3E-04	HI=	3.8E+00
Spring 15^c									
TCE	1	1	100	1.2	µg/L	1.6E+00	8.0E-07	3.7E+01	3.2E-02
OU4: HE Process Area (Spring 4)									
TCE	1	25	4	0.8	µg/L	1.6E+00	5.0E-07	3.7E+01	2.2E-02
Spring 5^c (includes W-817-03A^c as representative of Spring 5)									
cis-1,2-DCE	23	28	82	3.3	µg/L	NA	NA	6.1E+01	5.4E-02
1,1,2-TCA	2	56	3.6	0.65	µg/L	2.0E-01	3.3E-06	2.4E+01	2.7E-02
TCE	57	57	100	150	µg/L	1.6E+00	9.4E-05	3.7E+01	4.1E+00
Tritium	2	32	6.3	55	pCi/L	*	*	*	*
						Risk Total =	9.7E-05	HI =	4.2E+00

Table 1-17. Contaminants of potential concern^a reported in surface water at a frequency greater than 2%, Preliminary Remediation Goals (PRGs), baseline cancer risk, and noncancer hazard. (Cont. Page 2 of 3)

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Cancer PRG ^b	Risk	Noncancer PRG ^b	Hazard quotient
Spring 14									
None									
OU5: Building 850/Pits 3 & 5 (Spring 6)									
PCE	1	13	7.7	0.57	µg/L	1.1E+00	5.2E-07	2.5E+02	2.3E-03
TCE	1	13	7.7	0.76	µg/L	1.6E+00	4.2E-07	3.7E+01	1.8E-02
Tritium	1	19	5.3	17	pCi/L	*	*	*	*
Risk Total =							9.4E-07	HI =	2.0E-02
Well 8 Spring									
Tritium	73	73	80	770,000	pCi/L	6.7E+02	1.2E-03	NA	NA
OU6: Building 854 (Spring 10)									
TCE	2	10	20	0.7	µg/L	1.6E+00	4.2E-07	3.7E+01	1.8E-02
Tritium	1	5	20	130	pCi/L	*	*	*	*
Spring 11									
TCE	2	11	19	1.0	µg/L	1.6E+00	6.2E-07	3.7E+01	2.7E-02
Tritium	1	5	20	163	pCi/L	*	*	*	*
OU7: Building 832 Canyon (Spring 3)									
cis-1,2-DCE	1	10	10	2.2	µg/L	NA	NA	6.1E+01	3.6E-02
trans-1,2-DCE	1	11	9.1	0.53	µg/L	NA	NA	1.2E+02	4.4E-03
PCE	1	21	4.8	3.7	µg/L	1.1E+00	3.4E-06	2.5E+02	1.5E-02
TCE	18	27	67	200	µg/L	1.6E+00	1.3E-04	3.7E+01	5.4E+00
Risk Total =							1.3E-04	HI =	5.5E+00

Table 1-17. Contaminants of potential concern^a reported in surface water at a frequency greater than 2%, Preliminary Remediation Goals (PRGs), baseline cancer risk, and noncancer hazard. (Cont. Page 3 of 3)

Constituent	Number of detections	Number of samples	Percent detections	Maximum result	Units	Cancer PRG ^b	Risk	Noncancer PRG ^b	Hazard quotient
Site 300 springs unrelated to release sites									
<i>Springs 8, 13, 16, 17, 18, 20, 21, 22, 23</i>									
None									
<i>Spring 9</i>									
1,2-DCE (total) ^d	1	4	25	6.1	µg/L	NA	NA	6.1E+01	1.0E-01
TCE	1	5	20	7.0	µg/L	1.6E+00	4.4E-06	3.7E+01	1.9E-01
<i>Spring 12</i>									
1,2-DCE (total) ^d	1	5	20	3.2	µg/L	NA	NA	6.1E+01	1.0E-01
TCE	1	6	17	1.0	µg/L	1.6E+00	6.3E-07	3.7E+01	2.7E-02

Notes:

DCA = Dichloroethane.

DCE = Dichloroethylene.

HI = Hazard Index.

NA = Not applicable or not available.

PCE = Tetrachloroethylene.

TCA = Trichlorethane.

TCE = Trichloroethylene.

All non-volatile substances detected in surface water were also detected in ground water, and thus considered under that media.

Pathway specific (i.e., inhalation) PRGs were not available for water.

Therefore, tap water PRG was used for nonradiological constituents.

The drinking water PRG was used for radiological constituents.

These PRGs include ingestion, dermal absorption and inhalation, and are therefore conservative.

Cancer PRG concentrations that equate to a 10⁻⁶ cancer risk.

Noncancer PRG concentrations that equate to a hazard quotient of 1 for noncarcinogenic concerns.

Xylenes: The m-xylene PRG was used.

^a For this table, only volatile substances were considered, as they represent the only substances presenting a true risk.^b EPA Region IX (PRG) and result in similar units.^c No surface flow.^d PRG for cis-1,2-DCE used.

* Tritium result below background.

Table 1-18. Baseline human health risk assessment summary for Site 300 (from previous reports)^a.

Operable unit (OU)	Risk assessment conducted/document	Human health risk assessment			
		Exposure pathway evaluated	Contaminant of potential concern evaluated	Individual lifetime cancer risk	Hazard quotient
OU2: Building 834	Yes: Site-Wide Remedial Investigation (SWRI) report Chapter 6 and 10	Inhalation of fugitive (airborne) dust; contaminants bound to resuspended soil particles (adult onsite exposure)	Acetone	Not carcinogenic	2.5×10^{-9}
			Cadmium	3.9×10^{-7}	7.2×10^{-5}
			Freon 11	Not carcinogenic	2.9×10^{-10}
			Freon 113	Not carcinogenic	5.5×10^{-12}
			TCE	1.1×10^{-12}	4.3×10^{-8}
			Total xylenes	<u>Not carcinogenic</u>	<u>8.0×10^{-12}</u>
				Total Risk = 3.9×10^{-7}	HI = 7.2×10^{-5}
		Incidental ingestion and direct dermal contact with contaminants in surface soil (<0.5 ft) (adult onsite exposure)	Acetone	Not carcinogenic	6.1×10^{-7}
			Cadmium	NA	1.1×10^{-2}
			Freon 11	Not carcinogenic	4.6×10^{-8}
			Freon 113	Not carcinogenic	1.3×10^{-9}
			TCE	4.1×10^{-10}	1.0×10^{-5}
			Total xylenes	<u>Not carcinogenic</u>	<u>1.9×10^{-9}</u>
				Total Risk = 4×10^{-10}	HI = 1.1×10^{-2}
		Inhalation of contaminants volatilized from subsurface soil to air inside Building 834D (adult onsite exposure)	Benzene	4.1×10^{-8}	NA
			Ethylbenzene	Not carcinogenic	1.1×10^{-5}
			Freon 11	Not carcinogenic	1.2×10^{-2}
			PCE	Not carcinogenic	2.0×10^{-5}
			Toluene	1.3×10^{-4}	7.1×10^{-1}
			TCE	9.2×10^{-4}	3.5×10^1
			Total xylenes	<u>Not carcinogenic</u>	<u>1.2×10^{-5}</u>
				Total Risk = 1.0×10^{-3}	HI = 36
		Inhalation of contaminants volatilized from subsurface soil to air outside in vicinity of Building 834D (adult onsite exposure)	Benzene	2.4×10^{-8}	NA
			Ethylbenzene	Not carcinogenic	1.0×10^{-5}
			Freon 11	Not carcinogenic	5.4×10^{-3}
			PCE	8.2×10^{-5}	4.5×10^{-1}
			Toluene	Not carcinogenic	1.5×10^{-5}
			TCE	5.6×10^{-4}	2.1×10^1
			Total xylenes	<u>Not carcinogenic</u>	<u>1.2×10^{-5}</u>
				Total Risk = 6.4×10^{-4}	HI = 21

Table 1-18. Baseline human health risk assessment summary for Site 300 (from previous reports)^a. (Cont. Page 2 of 13)

Operable unit (OU)	Risk assessment conducted/document	Human health risk assessment			
		Exposure pathway evaluated	Contaminant of potential concern evaluated	Individual lifetime cancer risk	Hazard quotient
OU2: Building 834 (cont.)		Additive risk and HI for adults onsite outside in the Building 834 OU (adult onsite exposure):			
		– Subsurface soil in the vicinity of Building 834D		6×10^{-4}	2.2×10^1
		– Surface soil throughout the OU (resuspended particulates)		4×10^{-7}	7.2×10^{-5}
		– Surface soil throughout the OU (ingestion and dermal contact)		4×10^{-10}	1.1×10^{-2}
				Total Risk = 6×10^{-4}	HI = 22
		Ingestion of contaminants in ground water from perched aquifer from well CDF-1 (residential exposure)	Acetone	Not carcinogenic	2.8×10^{-11}
			Benzene	4.4×10^{-14}	NA
			Chloroform	2.0×10^{-13}	7.0×10^{-10}
			1,1-DCE	2.8×10^{-12}	6.9×10^{-10}
			cis-1,2-DCE	Not carcinogenic	1.0×10^{-6}
			Ethylbenzene	Not carcinogenic	9.4×10^{-12}
			Freon 113	Not carcinogenic	8.4×10^{-13}
			Methylene chloride	5.2×10^{-14}	3.1×10^{-10}
			PCE	1.5×10^{-12}	6.6×10^{-9}
			Toluene	Not carcinogenic	2.0×10^{-11}
			1,1,1-TCA	Not carcinogenic	7.2×10^{-9}
			TCE	6.4×10^{-11}	1.7×10^{-6}
			Total xylenes	Not carcinogenic	1.5×10^{-12}
				Total Risk = 6.9×10^{-11}	HI = 2.7×10^{-6}
OU3: Pit 6 Landfill	Yes: SWRI Chapter 6 and 12	Inhalation of fugitive (airborne) dust; contaminants bound to resuspended soil particles (adult onsite exposure)	Freon 11	Not carcinogenic	1.3×10^{-10}
			HMX	Not carcinogenic	6.7×10^{-10}
			RDX	NA	3.4×10^{-8}
				Total Risk = NA	HI = 3.5×10^{-8}
		Incidental ingestion and direct contact with contaminants in surface soil (<0.5 ft) (adult onsite exposure)	Freon 11	Not carcinogenic	2.1×10^{-8}
			HMX	Not carcinogenic	3.0×10^{-6}
			RDX	1.8×10^{-8}	1.5×10^{-4}
				Total Risk = 1.8×10^{-8}	HI = 1.5×10^{-4}
		Inhalation of contaminants volatilized from subsurface soil to air in the vicinity of Spring 7 (adult onsite exposure)	Ethylbenzene	Not carcinogenic	9.0×10^{-6}
			PCE	3.6×10^{-8}	2.0×10^{-4}
			Toluene	Not carcinogenic	6.1×10^{-5}
			TCE	1.7×10^{-7}	6.5×10^{-3}
			Total xylenes	Not carcinogenic	3.1×10^{-6}
				Total Risk = 2.1×10^{-7}	HI = 6.8×10^{-3}

Table 1-18. Baseline human health risk assessment summary for Site 300 (from previous reports)^a. (Cont. Page 3 of 13)

Operable unit (OU)	Risk assessment conducted/document	Human health risk assessment			
		Exposure pathway evaluated	Contaminant of potential concern evaluated	Individual lifetime cancer risk	Hazard quotient
OU3: Pit 6 Landfill (cont.)	Inhalation of contaminants volatilized from subsurface soil to air in the vicinity of the rifle range (adult onsite exposure)		Chloroform	1.1×10^{-6}	3.9×10^{-3}
			1,2-DCE	Not carcinogenic	1.5×10^{-4}
			Freon 11	Not carcinogenic	5.2×10^{-5}
			Freon 113	Not carcinogenic	3.0×10^{-6}
			Methylene chloride	4.0×10^{-9}	5.3×10^{-5}
			PCE	2.3×10^{-6}	1.3×10^{-2}
			1,1,1-TCA	Not carcinogenic	2.8×10^{-6}
			TCE	1.4×10^{-6}	5.2×10^{-2}
			Total Risk = 4.8×10^{-6}		HI = 6.9×10^{-2}
	Inhalation of contaminants volatilized from surface water to air in the vicinity of Spring 7 (adult onsite exposure)		Chloroform	3.2×10^{-6}	1.1×10^{-2}
			1,2-DCA	3.3×10^{-6}	NA
			cis-1,2-DCE	Not carcinogenic	1.3×10^{-1}
			trans-1,2-DCE	Not carcinogenic	2.1×10^{-1}
			PCE	1.2×10^{-6}	6.4×10^{-3}
			TCE	3.0×10^{-5}	1.1×10^0
			Total xylenes	Not carcinogenic	5.0×10^{-5}
			Total Risk = 3.8×10^{-5}		HI = 1.5
	Additive risk and HI for adults onsite in the Pit 6 Landfill OU:				
	- Spring 7			4×10^{-5}	1.5×10^0
				2×10^{-7}	6.8×10^{-3}
	- Vicinity of Spring 7				
		Inhalation of resuspended particulates in Pit 6 OU		NA	3.4×10^{-8}
	- Ingestion and dermal contact with surface soil in Pit 6 OU			2×10^{-8}	1.5×10^{-4}
				Total Risk = 4×10^{-5}	HI = 1.5
	Inhalation of contaminants volatilized from surface water to air in the vicinity of Carnegie State Vehicular Recreation Area Residence Pond (residential exposure)		Acetone	Not carcinogenic	3.7×10^{-5}
			Bis (2-ethylhexyl) phthalate	2.3×10^{-8}	3.2×10^{-4}
			Butylbenzylphthalate	NA	3.1×10^{-6}
			Carbon disulfide	Not carcinogenic	2.0×10^{-5}
			Chloroform	6.3×10^{-8}	1.8×10^{-4}
			1,2-DCA	8.9×10^{-8}	NA
			Total 1,2-DCE	Not carcinogenic	2.9×10^{-3}

Table 1-18. Baseline human health risk assessment summary for Site 300 (from previous reports)^a. (Cont. Page 4 of 13)

Operable unit (OU)	Risk assessment conducted/document	Exposure pathway evaluated	Human health risk assessment			
			Contaminant of potential concern evaluated	Individual lifetime cancer risk	Hazard quotient	
OU3: Pit 6 Landfill (cont.)			Ethylbenzene	Not carcinogenic	1.4×10^{-5}	
			Methylene chloride	6.5×10^{-9}	7.2×10^{-5}	
			Phenolics	Not carcinogenic	7.8×10^{-7}	
			PCE	2.3×10^{-6}	7.2×10^{-2}	
			Toluene	Not carcinogenic	3.5×10^{-5}	
			1,1,1-TCA	Not carcinogenic	1.7×10^{-5}	
			TCE	1.1×10^{-7}	5.0×10^{-4}	
			Total xylenes	<u>Not carcinogenic</u>	<u>3.3×10^{-6}</u>	
				Total Risk = 2.6×10^{-6}	HI = 7.6×10^{-2}	
		Residential use of contaminated ground water from the Ranger well (CARNRW2)	Acetone	Not carcinogenic	1.8×10^{-5}	
			Bis(2-ethylhexyl) phthlate	1.5×10^{-7}	1.3×10^{-3}	
			Butylbenzylphthalate	NA	3.0×10^{-5}	
			Carbon disulfide	Not carcinogenic	3.3×10^{-6}	
			Chloroform	8.0×10^{-9}	2.9×10^{-5}	
			1,2-DCA	1.5×10^{-8}	NA	
			Total 1,2-DCE	Not carcinogenic	4.5×10^{-4}	
			Ethylbenzene	Not carcinogenic	2.3×10^{-6}	
			Methylene chloride	1.9×10^{-9}	1.2×10^{-5}	
			Phenolics	Not carcinogenic	1.4×10^{-5}	
			PCE	2.2×10^{-8}	9.7×10^{-5}	
			Toluene	Not carcinogenic	5.1×10^{-6}	
			1,1,1-TCA	Not carcinogenic	5.1×10^{-6}	
			TCE	4.3×10^{-7}	1.1×10^{-2}	
			Total xylenes	<u>Not carcinogenic</u>	<u>5.5×10^{-7}</u>	
				Total Risk = 6.3×10^{-7}	HI = 1.3×10^{-2}	
		Additive risk and HI for residential exposures associated with contaminated ground water from the Pit 6 OU:				
		– Residential use of ground water			6×10^{-7}	1.3×10^{-2}
		– Inhalation of contaminants that volatilize from the Residence Pond			<u>3×10^{-6}</u>	<u>7.7×10^{-2}</u>
					Total Risk = 4×10^{-6}	HI = 9.0×10^{-2}
		Ingestion of contaminants in ground water from the Qt-Tmss hydrologic unit from Ranger well (CARNRW2) (residential exposure)	Acetone	Not carcinogenic	4.8×10^{-7}	
			Bis(2-ethylhexyl)	2.8×10^{-9}	2.4×10^{-5}	

Table 1-18. Baseline human health risk assessment summary for Site 300 (from previous reports)^a. (Cont. Page 5 of 13)

Operable unit (OU)	Risk assessment conducted/document	Exposure pathway evaluated	Human health risk assessment		
			Contaminant of potential concern evaluated	Individual lifetime cancer risk	Hazard quotient
OU3: Pit 6 Landfill (cont.)			phthalate		
			Butylbenzylphthalate	NA	1.6×10^{-6}
			Carbon disulfide	Not carcinogenic	5.7×10^{-8}
			Chloroform	7.8×10^{-11}	5.9×10^{-7}
			Ethylbenzene	Not carcinogenic	4.1×10^{-8}
			1,2-DCA	3.0×10^{-10}	NA
			Total 1,2-DCE	Not carcinogenic	8.6×10^{-6}
			Methylene chloride	7.5×10^{-11}	2.1×10^{-7}
			Phenolics	Not carcinogenic	9.0×10^{-7}
			PCE	4.0×10^{-10}	1.8×10^{-6}
			Toluene	Not carcinogenic	9.9×10^{-8}
			1,1,1-TCA	Not carcinogenic	1.9×10^{-7}
			TCE	1.1×10^{-8}	2.4×10^{-4}
			Total xylenes	<u>Not carcinogenic</u>	<u>9.8×10^{-9}</u>
			Total Risk = 1.5×10^{-8}		HI = 2.8×10^{-4}
OU4: HE Process Area	Yes: SWRI Chapter 6 and 13	Inhalation of fugitive (airborne) dust; contaminants bound to resuspended soil particles (adult onsite exposure)	Acetone	Not carcinogenic	1.8×10^{-9}
			cis-1,2-DCE	Not carcinogenic	1.3×10^{-10}
			Freon 11	Not carcinogenic	5.1×10^{-12}
			TCE	7.8×10^{-15}	3.0×10^{-10}
			Cadmium	2.7×10^{-7}	5.0×10^{-5}
			Copper	Not carcinogenic	5.4×10^{-6}
			HMX	Not carcinogenic	4.4×10^{-8}
			RDX	NA	3.9×10^{-8}
			Zinc	<u>Not carcinogenic</u>	<u>1.2×10^{-6}</u>
			Total Risk = 2.7×10^{-7}		HI = 5.6×10^{-5}
		Incidental ingestion and direct dermal contact with contaminants in surface soil (adult onsite exposure)	Acetone	Not carcinogenic	4.4×10^{-7}
			cis-1,2-DCE	Not carcinogenic	3.2×10^{-8}
			Freon 11	Not carcinogenic	1.2×10^{-9}
			TCE	2.8×10^{-12}	7.1×10^{-8}
			Cadmium	NA	7.6×10^{-3}
			Copper	Not carcinogenic	8.2×10^{-4}
			HMX	Not carcinogenic	2.0×10^{-4}
			RDX	2.1×10^{-8}	1.8×10^{-4}
			Zinc	<u>Not carcinogenic</u>	<u>1.8×10^{-4}</u>
			Total Risk = 2.1×10^{-8}		HI = 9.0×10^{-3}

Table 1-18. Baseline human health risk assessment summary for Site 300 (from previous reports)^a. (Cont. Page 6 of 13)

Operable unit (OU)	Risk assessment conducted/document	Human health risk assessment			
		Exposure pathway evaluated	Contaminant of potential concern evaluated	Individual lifetime cancer risk	Hazard quotient
OU4: HE Process Area (cont.)	Inhalation of contaminants volatilized from subsurface soil to atmosphere in vicinity of B815 (adult onsite exposure)	Freon 11	Not carcinogenic	1.5×10^{-3}	
		Methylene chloride	3.3×10^{-8}	4.4×10^{-4}	
		PCE	1.4×10^{-6}	7.6×10^{-3}	
		Toluene	Not carcinogenic	3.2×10^{-5}	
		TCE	3.7×10^{-6}	1.4×10^{-1}	
		Total xylenes	<u>Not carcinogenic</u>	<u>6.5×10^{-6}</u>	
		Total Risk = 5.1×10^{-6}			HI = 1.5×10^{-1}
		Inhalation of contaminants that volatilize from the surface of Spring 5 in the HE Process Area OU (adult onsite exposure)	Chloroform	2.4×10^{-7}	8.2×10^{-4}
			1,1-DCE	8.2×10^{-6}	2.1×10^{-3}
			cis-1,2-DCE	Not carcinogenic	2.5×10^{-3}
			1,2-DCPa	1.8×10^{-7}	NA
			PCE	8.8×10^{-8}	4.8×10^{-4}
			1,1,2-TCA	1.5×10^{-7}	1.8×10^{-3}
			TCE	<u>4.8×10^{-6}</u>	<u>1.8×10^{-1}</u>
		Total Risk = 1.4×10^{-5}			HI = 1.9×10^{-1}
	Additive risk and HI for adults onsite in the HE Process Area OU:				
	– Spring 5			1×10^{-5}	1.9×10^{-1}
	– Inhalation of resuspended particulates			3×10^{-7}	5.6×10^{-5}
	– Ingestion and dermal contact with surface soil			<u>2×10^{-8}</u>	<u>9.0×10^{-3}</u>
	Total Risk = 1×10^{-5}			HI = 2.0×10^{-1}	
	Ingestion of contaminants in ground water at hypothetical domestic water-supply well in Tnbs ₂ aquifer at southern site boundary (residential exposure)	Chloroform	2.9×10^{-7}	1.0×10^{-3}	
		1,1-DCA	NA	2.8×10^{-5}	
		1,2-DCA	1.2×10^{-7}	NA	
		1,1-DCE	4.6×10^{-6}	1.2×10^{-3}	
		1,2-DCE	Not carcinogenic	4.0×10^{-4}	
		Freon 11	Not carcinogenic	8.4×10^{-8}	
		Phenolics	Not carcinogenic	4.6×10^{-5}	
		Tetrahydrofuran	NA	NA	
		Toluene	Not carcinogenic	1.4×10^{-3}	
		TCE	2.8×10^{-6}	7.5×10^{-2}	
		Total xylenes	Not carcinogenic	2.8×10^{-6}	
		HMX	Not carcinogenic	9.5×10^{-5}	
		RDX	<u>1.8×10^{-6}</u>	<u>1.2×10^{-2}</u>	
		Total Risk = 9.6×10^{-6}			HI = 9.1×10^{-2}

Table 1-18. Baseline human health risk assessment summary for Site 300 (from previous reports)^a. (Cont. Page 7 of 13)

Operable unit (OU)	Risk assessment conducted/document	Human health risk assessment			
		Exposure pathway evaluated	Contaminant of potential concern evaluated	Individual lifetime cancer risk	Hazard quotient
OU5: Building 850/Pits 3 & 5	Yes: SWRI Chapter 6 and 11, Building 850 SWRI Addendum	Inhalation of fugitive (airborne) dust; contaminants bound to resuspended soil particles from vicinity of Building 850 firing table (adult onsite exposure) (Building 850 SWRI Addendum)	Beryllium	6×10^{-8}	3.9×10^{-6}
			Cadmium	1×10^{-7}	5.2×10^{-5}
			Copper	Not carcinogenic	9.4×10^{-5}
			Uranium-238	1×10^{-7}	4.6×10^{-5}
				Total Risk = 2.6×10^{-7}	HI = 2.0×10^{-4}
		Inhalation of fugitive (airborne) dust; contaminants bound to resuspended soil particles throughout the Building 850/Pit 7 Complex (adult onsite exposure) (Building 850 SWRI Addendum)	Thorium-232	1×10^{-8}	NA
			Uranium-235	7×10^{-10}	3.4×10^{-8}
			Uranium-238	2×10^{-8}	8.6×10^{-6}
				Total Risk = 3.1×10^{-8}	HI = 8.8×10^{-6}
		Incidental ingestion and direct dermal contact with contaminants in surface soil throughout the Building 850/Pit 7 Complex (adult onsite exposure) (Building 850 SWRI Addendum)	Thorium-232	3.9×10^{-9}	NA
			Uranium-235	4×10^{-10}	5.2×10^{-6}
			Uranium-238	2×10^{-8}	1.3×10^{-3}
				Total Risk = 2.4×10^{-8}	HI = 1.3×10^{-3}
		Incidental ingestion and direct dermal contact with contaminants in surface soil in the vicinity of Building 850 firing table (adult onsite exposure) (Building 850 SWRI Addendum)	Cadmium	NA	7.9×10^{-3}
			Copper	Not carcinogenic	1.4×10^{-3}
			Uranium-238	1×10^{-7}	6.9×10^{-3}
				Total Risk = 1×10^{-7}	HI = 2.9×10^{-2}
		Inhalation of resuspended particulates and ingestion and dermal contact with surface soil (adult onsite exposure) (Building 850 SWRI Addendum)	CDDs, CDFs ^b	5.3×10^{-3}	Not calculated
			PCBs	9.5×10^{-5}	No hazard data available
				Total Risk = 5.4×10^{-3}	NA
		Inhalation of tritium evaporating from subsurface soil to the atmosphere in the vicinity of: (adult onsite exposure) (SWRI Chapter 11):			
			- Building 850 firing table	Tritium	2.6×10^{-8}
			- Pit 3	Tritium	4×10^{-6}
			- Pit 5	Tritium	4×10^{-8}
		Additive risk and HI for adults onsite in the Building 850 OU (adult onsite exposure) (SWRI Chapter 11):			
			- Inhalation of triated vapor (Building 850 firing table)		6×10^{-7}
			- Inhalation of resuspended particulates (Building 850 firing table)		3×10^{-8}
			- Ingestion and dermal contact with surface soil (Building 850 firing table)		5.4×10^{-3}
				Total Risk = 5.4×10^{-3}	HI = 1.3×10^{-3}

Table 1-18. Baseline human health risk assessment summary for Site 300 (from previous reports)^a. (Cont. Page 8 of 13)

Operable unit (OU)	Risk assessment conducted/document	Human health risk assessment			
		Exposure pathway evaluated	Contaminant of potential concern evaluated	Individual lifetime cancer risk	Hazard quotient
OU5: Building 850/Pits 3 & 5 (cont.)		Inhalation of tritium evaporating from surface water to the atmosphere in the vicinity of (adult onsite exposure) (SWRI Chapter 11):			
		– Well 8 Spring	Tritium	2×10^{-8}	Not calculated
		– Spring 6	Tritium	4×10^{-8}	NA
		Residential use of ground water contaminated with uranium-238 at the boundary of Site 300 (Building 850 SWRI Addendum):			
		– Pit 7	Uranium-238	1×10^{-7}	9.9×10^{-3}
		– Pit 5	Uranium-238	6×10^{-7}	4.9×10^{-2}
		– Building 850	Uranium-238	4×10^{-7}	3.5×10^{-2}
		– Building 850 and Pit 5	Uranium-238	4×10^{-7}	2.9×10^{-2}
		Residential use of contaminated ground water from Pit 5 at a hypothetical well located at the northeast Site 300 boundary (SWRI Chapter 11)	Acetone	Not carcinogenic	3.4×10^{-5}
			Carbon disulfide	Not carcinogenic	4.9×10^{-5}
			Chloroform	2.0×10^{-6}	7.3×10^{-3}
			1,2-DCA	1.3×10^{-8}	NA
			1,1-DCE	6.1×10^{-7}	1.6×10^{-4}
			Freon 113	Not carcinogenic	2.8×10^{-6}
			Phenolics	Not carcinogenic	5.3×10^{-3}
			PCE	1.1×10^{-8}	4.8×10^{-5}
			Toluene	Not carcinogenic	4.6×10^{-6}
			TCE	4.2×10^{-8}	1.1×10^{-3}
			Total xylenes	<u>Not carcinogenic</u>	<u>2.2×10^{-6}</u>
				Total Risk = 2.7×10^{-6}	HI = 1.4×10^{-2}
		Total risk attributable to residential use of tritium-contaminated ground water from (SWRI Chapter 11):			
		– Pit 3		2×10^{-9}	Not calculated
		– Pit 5		3×10^{-8}	Not calculated
		Residential use of ground water contaminated with Uranium-238 at a hypothetical well located at the Site 300 boundary (Building 850 SWRI Addendum):			
		– Pit 7		1×10^{-7}	9.9×10^{-3}
		– Pit 5		6×10^{-7}	4.9×10^{-2}
		– Building 850		4×10^{-7}	3.5×10^{-2}
		– Building 850 and Pit 5		4×10^{-7}	2.9×10^{-2}

Table 1-18. Baseline human health risk assessment summary for Site 300 (from previous reports)^a. (Cont. Page 9 of 13)

Operable unit (OU)	Risk assessment conducted/document	Human health risk assessment			
		Exposure pathway evaluated	Contaminant of potential concern evaluated	Individual lifetime cancer risk	Hazard quotient
OU6: Building 854	Yes: SWRI Chapter 6 and 11, Building 854 Characterization Summary Report	Inhalation of fugitive (airborne) dust; contaminants bound to resuspended soil particles from East Firing Area/West Firing Area (EFA/WFA) study area (adult onsite exposure) (SWRI Chapter 11)	Freon 11	NA	1.2×10^{-10}
			Freon 113	7.3×10^{-8}	1.7×10^{-11}
			Beryllium	1.3×10^{-8}	8.9×10^{-7}
			Cadmium	1.0×10^{-8}	1.9×10^{-6}
			Copper	Not carcinogenic	6.1×10^{-6}
			RDX	Not carcinogenic	5.7×10^{-8}
			Uranium-238	Not carcinogenic	1.3×10^{-5}
			Zinc	<u>Not carcinogenic</u>	<u>9.0×10^{-7}</u>
				Total Risk = 9.6×10^{-8}	HI = 1.4×10^{-2}
		Incidental ingestion and dermal absorption of contaminants in surface soil in the EFA/WFA study area (adult onsite exposure) (SWRI Chapter 11)	Freon 11	Not carcinogenic	1.9×10^{-8}
			Freon 113	Not carcinogenic	4.1×10^{-9}
			Cadmium	NA	2.8×10^{-4}
			Copper	Not carcinogenic	9.3×10^{-4}
			RDX	1.0×10^{-9}	2.6×10^{-4}
			Uranium-238	7.4×10^{-9}	2.0×10^{-3}
			Zinc	<u>Not carcinogenic</u>	<u>1.4×10^{-4}</u>
				Total Risk = 8.4×10^{-9}	HI = 3.7×10^{-3}
		Inhalation of resuspended particulates and ingestion and dermal contact with surface soil (adult onsite exposure) (Building 850 SWRI Addendum)	PCB 1242	2.6×10^{-5}	NA
			PCB 1248	<u>4×10^{-5}</u>	<u>NA</u>
				Total Risk = 6.6×10^{-5}	HI = NA
		Inhalation of contaminants volatilizing from subsurface soil to the atmosphere in the vicinity of Building 854F (adult onsite exposure) (B854 Characterization Summary report)	Chloroform	9.2×10^{-6}	Not calculated
			1,2-DCA	1.1×10^{-6}	Not calculated
			1,1-DCE	8.3×10^{-7}	Not calculated
			1,2-DCPa	9.5×10^{-7}	Not calculated
			1,1,2-TCA	3.6×10^{-7}	Not calculated
			Vinyl chloride	<u>9.0×10^{-7}</u>	<u>Not calculated</u>
				Total Risk = 1.3×10^{-5}	HI = Not calculated
		Inhalation of TCE volatilizing from subsurface soil and diffusing into Building 854F (adult onsite exposure) (Building 854 Characterization Summary report)	Chloroform	4.7×10^{-6}	Not calculated
			1,1-DCE	7.5×10^{-7}	Not calculated
			1,2-DCA	9.5×10^{-7}	Not calculated
			1,2-DCPa	8.1×10^{-7}	Not calculated
			1,1,2-TCA	3.2×10^{-7}	Not calculated
			TCE	3.4×10^{-7}	9.9×10^0
			Vinyl chloride	<u>8.1×10^{-7}</u>	<u>Not calculated</u>
				Total Risk = 8.7×10^{-6}	HI = 9.9×10^0

Table 1-18. Baseline human health risk assessment summary for Site 300 (from previous reports)^a. (Cont. Page 10 of 13)

Operable unit (OU)	Risk assessment conducted/document	Human health risk assessment			
		Exposure pathway evaluated	Contaminant of potential concern evaluated	Individual lifetime cancer risk	Hazard quotient
OU7: Building 832 Canyon	Some: SWRI (B830) Chapter 6 and 9 and Building 832 Canyon Characterization Summary Report	Inhalation of TCE volatilizing from subsurface soil and diffusing into Building 854A (adult onsite exposure) (Building 854 Characterization Summary report)	Chloroform	5.1×10^{-7}	Not calculated
			1,1-DCE	9.2×10^{-7}	Not calculated
			1,2-DCA	1.2×10^{-6}	Not calculated
			1,2-DCPa	1.0×10^{-7}	Not calculated
			Methylene chloride	1.0×10^{-6}	Not calculated
			1,1,2-TCA	3.9×10^{-7}	Not calculated
			Vinyl chloride	9.8×10^{-7}	Not calculated
			Total Risk = 5.1×10^{-6}		HI = Not calculated
	Some: SWRI (B830) Chapter 6 and 9 and Building 832 Canyon Characterization Summary Report	Inhalation of contaminants volatilizing from surface water (Spring 3) (assumes migration of contaminants from Building 830 to Spring 3) (SWRI Chapter 9) (adult onsite exposure)	PCE	6.0×10^{-5}	2.3×10^0
			TCE	5.1×10^{-6}	2.8×10^{-2}
			Total Risk = 6.5×10^{-5}		HI = 2.3
		Inhalation of contaminants volatilized from subsurface soil to atmosphere inside Building 830 (adult onsite exposure) (Building 832 Canyon Characterization Summary report)	Freon 113	Exposure point <PRG	Not calculated
			Methylene chloride	Exposure point <PRG	Not calculated
			TCE	2.6×10^{-7}	Not calculated
			Vinyl chloride	2.5×10^{-6}	Not calculated
			Total Risk = 2.8×10^{-6}		HI = Not calculated
		Inhalation of contaminants volatilized from subsurface soil to atmosphere in vicinity of Building 830 (adult onsite exposure) (Building 832 Canyon Characterization Summary report)	Chloroform	4.5×10^{-6}	Not calculated
			1,2-DCA	3.5×10^{-6}	Not calculated
			Freon 113	Exposure point <PRG	Not calculated
			Methylene chloride	Exposure point <PRG	Not calculated
			PCE	Exposure point <PRG	Not calculated
			TCE	3.3×10^{-7}	Not calculated
			Vinyl chloride	1.6×10^{-6}	Not calculated
			Total Risk = 9.9×10^{-6}		HI = Not calculated
		Inhalation of contaminants volatilized from subsurface soil to atmosphere inside Building 832 (adult onsite exposure) (Building 832 Canyon Characterization Summary report)	Chloroform	4.5×10^{-7}	Not calculated
			1,2-DCPa	2.8×10^{-6}	Not calculated
			Freon 113	Exposure point <PRG	Not calculated
			Methylene chloride	Exposure point <PRG	Not calculated
			PCE	Exposure point <PRG	Not calculated
			TCE	Exposure point <PRG	Not calculated
			Total Risk = 3.2×10^{-6}		HI = Not calculated

Table 1-18. Baseline human health risk assessment summary for Site 300 (from previous reports)^a. (Cont. Page 11 of 13)

Operable unit (OU)	Risk assessment conducted/document	Exposure pathway evaluated	Human health risk assessment		
			Contaminant of potential concern evaluated	Individual lifetime cancer risk	Hazard quotient
OU7: Building 832 Canyon (cont.)		Inhalation of contaminants volatilized from subsurface soil to atmosphere in vicinity of Building 832 (adult onsite exposure) (Building 832 Canyon Characterization Summary report)	Chloroform 1,2-DCA 1,1-DCE cis-1,2-DCE 1,2-DCPa Freon 113 Methylene chloride PCE 1,1,2-TCA TCE Vinyl chloride	Exposure point <PRGs; risk not calculated	Concentrations below PRGs; hazard not calculated
OU8: Site 300 Release Sites:					
Building 801 Dry Well	Yes: SWRI Chapter 6 and 11	VOC contamination in subsurface soil at depths greater than 12 ft; no complete exposure pathway, therefore risk not calculated.	Not applicable	Not applicable	Not applicable
Building 802 Firing Table	Yes: SWRI Chapter 6 and 11	Inhalation of fugitive (airborne) dust; contaminants bound to resuspended soil particles from EFA/WFA study area (adult onsite exposure) (SWRI Chapter 11)	Freon 11 Freon 113 Beryllium Cadmium Copper RDX Uranium-238 Zinc	Not carcinogenic Not carcinogenic 6×10^{-8} 1×10^{-7} Not carcinogenic NA 1×10^{-7} <u>Not carcinogenic</u>	1.2×10^{-10} 1.7×10^{-11} 3.9×10^{-6} 5.2×10^{-5} 9.3×10^{-5} 5.7×10^{-8} 4.6×10^{-5} 9.0×10^{-7} Total Risk = 3×10^{-7} HI = 2.0×10^{-4}
		Incidental ingestion and dermal absorption of contaminants in surface soil in the EFA/WFA study area (adult onsite exposure) (SWRI Chapter 11)	Freon 11 Freon 113 Cadmium Copper RDX Uranium-238 Zinc	Not carcinogenic Not carcinogenic NA Not carcinogenic 1.0×10^{-9} 7.4×10^{-9} <u>Not carcinogenic</u>	1.9×10^{-8} 4.1×10^{-9} 2.8×10^{-4} 9.3×10^{-4} 2.6×10^{-4} 2.0×10^{-3} 1.4×10^{-4} Total Risk = 8.4×10^{-9} HI = 3.6×10^{-3}
Building 833	Yes: SWRI Chapter 6 and 9	Inhalation of contaminants volatilizing from subsurface soil to air inside Building 833 (adult onsite exposure)	Chloroform Methylene chloride TCE	5.7×10^{-7} 1.2×10^{-8} 6.3×10^{-7} Total Risk = 1.2×10^{-6}	2.0×10^{-3} 1.6×10^{-4} 2.4×10^{-2} HI = 2.6×10^{-2}

Table 1-18. Baseline human health risk assessment summary for Site 300 (from previous reports)^a. (Cont. Page 12 of 13)

Operable unit (OU)	Risk assessment conducted/document	Human health risk assessment			
		Exposure pathway evaluated	Contaminant of potential concern evaluated	Individual lifetime cancer risk	Hazard quotient
Building 833 (cont.)	Yes: SWRI Chapter 6 and 11	Inhalation of fugitive (airborne) dust; contaminants bound to resuspended soil particles from Building 833 study area (adult onsite exposure)	Acetone	Not carcinogenic	2.6×10^{-9}
			Freon 11	Not carcinogenic	3.4×10^{-10}
			Freon 113	Not carcinogenic	2.2×10^{-12}
			Toluene	Not carcinogenic	7.2×10^{-11}
			1,1,1-TCA	<u>Not carcinogenic</u>	<u>6.9×10^{-11}</u>
			Total Risk = Not applicable		HI = 3.1×10^{-9}
		Incidental ingestion and direct dermal contact with contaminated surface soil in the Building 833 area (adult onsite exposure)	Acetone	Not carcinogenic	6.2×10^{-7}
			Freon 11	Not carcinogenic	5.4×10^{-8}
			Freon 113	Not carcinogenic	5.2×10^{-10}
			Toluene	Not carcinogenic	1.7×10^{-8}
			1,1,1-TCA	<u>Not carcinogenic</u>	<u>5.6×10^{-8}</u>
			Total Risk = Not applicable		HI = 7.5×10^{-7}
		Additive HI for adults onsite in the Building 833 study area:			
		- Inhalation of resuspended particulates		Not carcinogenic	3.1×10^{-9}
		- Ingestion and dermal contact with surface soil		<u>Not carcinogenic</u>	<u>7.5×10^{-7}</u>
				Total Risk = Not applicable	HI = 7.5×10^{-7}
		Residential use of contaminated ground water from the Building 833 study area at the CDF-1 well (adult onsite exposure)	Chloroform	2.9×10^{-20}	1.0×10^{-16}
			cis-1,2-DCE	Not carcinogenic	1.4×10^{-16}
			Freon 113	Not carcinogenic	1.0×10^{-20}
			Methylene chloride	4.3×10^{-21}	2.6×10^{-17}
			PCE	6.0×10^{-21}	2.7×10^{-17}
			Toluene	Not carcinogenic	4.7×10^{-17}
			TCE	<u>6.6×10^{-18}</u>	<u>1.8×10^{-13}</u>
			Total Risk = 6.6×10^{-18}		HI = 1.8×10^{-13}
Building 845 Firing Table	Yes: SWRI Chapter 6 and 11	Inhalation of fugitive (airborne) dust; contaminants bound to resuspended soil particles in the EFA/WFA study area (adult onsite exposure)	Freon 11	Not carcinogenic	1.2×10^{-10}
			Freon 113	Not carcinogenic	1.7×10^{-11}
			Beryllium	1.3×10^{-8}	8.9×10^{-7}
			Cadmium	1.0×10^{-8}	1.9×10^{-6}
			Copper	Not carcinogenic	6.1×10^{-6}
			RDX	NA	5.7×10^{-8}
			Uranium-238	7.3×10^{-8}	1.3×10^{-5}
			Zinc	<u>Not carcinogenic</u>	<u>9.0×10^{-7}</u>
			Total Risk = 9.6×10^{-8}		HI = 2.3×10^{-5}

Table 1-18. Baseline human health risk assessment summary for Site 300 (from previous reports)^a. (Cont. Page 13 of 13)

Operable unit (OU)	Risk assessment conducted/document	Human health risk assessment			
		Exposure pathway evaluated	Contaminant of potential concern evaluated	Individual lifetime cancer risk	Hazard quotient
Building 845 Firing Table (cont.)		Direct (dermal) contact and incidental ingestion contaminants in surface soil in the EFA/WFA study area (adult onsite exposure)	Freon 11	Not carcinogenic	1.9×10^{-8}
			Freon 113	Not carcinogenic	4.1×10^{-9}
			Cadmium	NA	2.8×10^{-4}
			Copper	Not carcinogenic	9.3×10^{-4}
			RDX	1.0×10^{-9}	2.6×10^{-4}
			Uranium-238	7.4×10^{-9}	2.0×10^{-3}
			Zinc	<u>Not carcinogenic</u>	<u>1.4×10^{-4}</u>
			Total Risk = 8.4×10^{-9}		
Building 851 Firing Table		Inhalation of resuspended particulates in the vicinity of the Building 851 firing table (adult onsite exposure)	Cadmium	1.8×10^{-7}	3.4×10^{-5}
			Copper	Not carcinogenic	7.2×10^{-6}
			Uranium 238	2.4×10^{-7}	4.2×10^{-5}
			Zinc	<u>Not carcinogenic</u>	<u>2.1×10^{-6}</u>
			Total Risk = 4.2×10^{-7}		
		Incidental ingestion and direct dermal contact with contaminated surface soil in the vicinity of the Building 851 firing table (adult onsite exposure)	Cadmium	NA	5.2×10^{-3}
			Copper	Not carcinogenic	1.1×10^{-3}
			Uranium 238	2.4×10^{-8}	6.5×10^{-3}
			Zinc	<u>Not carcinogenic</u>	<u>3.1×10^{-4}</u>
			Total Risk = 2.4×10^{-8}		

Notes:

CDDs = Chlorinated dibenzo-dioxins.

CDFs = Chlorinated dibenzo-furans.

DCA = Dichloroethane.

DCE = Dichloroethylene.

DCPa = Dichloropropane.

HMX = High Melting Explosive.

NA = Slope factor or RfD not available.

OU = Operable unit.

PCBs = Polychlorinated biphenyls.

PCE = Tetrachloroethylene.

PRG = Preliminary Remediation Goal.

RDX = Research Department Explosive.

RfD = Reference dose.

SWRI = Site-Wide Remedial Investigation.

TCA = Trichloroethane.

TCE = Trichloroethylene.

TEF = Toxicity Equivalence Factor.

^a The baseline risk assessment data presented in this table was compiled from the SWRI report (Webster-Scholten, 1994), the Building 850 SWRI Addendum (Taffet et al., 1996), the Building 854 Characterization Summary report (DOE, 1998a), and the Building 832 Canyon Characterization Summary report (DOE, 1997). This table does not contain risk assessment data calculated as part of the Site-Wide Feasibility Study.

^b As calculated by a TEF for 2,3,7,8-tetrachlorodi-benzo-p-dioxin.

Table 1-19. List of Contaminants of Concern for which no baseline risk assessment was conducted in the SWRI (by media and OU).

Media	OU	Contaminant of concern	Health assessment based on PRGs and max. conc. ^a	
			Risk	Hazard Index
Surface soil	Building 850/Pits 3 & 5	HMX	NA	<1
		Tritium	<10 ⁻⁶	NA
	Building 854	HMX	NA	<1
		Lead	<10 ⁻⁶	NA
		Tritium	Below background	
	Building 832 Canyon	HMX	NA	<1
	OU8: Building 851 Firing Table	RDX	<10 ⁻⁶	<1
Subsurface soil	HE Process Area	Benzene	<10 ⁻⁶	<1
		Chloroform	<10 ⁻⁶	<1
		cis-1,2-DCE	<10 ⁻⁶	<1
		Ethylbenzene	<10 ⁻⁶	<1
		Freon 113	<10 ⁻⁶	<1
		Freon 12	<10 ⁻⁶	<1
		Sum of VOC risk:	1.4 × 10 ⁻⁶	<1
		HMX	NA, no exposure pathway	
		RDX	NA, no exposure pathway	
	Building 850/Pits 3 & 5	Uranium-238	NA, no exposure pathway	
	Building 832 Canyon	HMX	NA, no exposure pathway	
		Nitrate	NA, no exposure pathway	
	OU8: Building 801 dry well	TCE	<10 ⁻⁶	<1
	OU8: Building 845 Firing Table	HMX	NA, no exposure pathway	
		Uranium-238	NA, no exposure pathway	
	OU8: Building 851 Firing Table	cis-1,2-DCE	<10 ⁻⁶	<1
		TCE	<10 ⁻⁶	<1
		Uranium-238	NA, no exposure pathway	
Surface water	SWRI baseline risk assessment conducted for all COCs in surface water			
Ground water ^a	Building 834	TBOS	NA	NA
		Nitrate	NA	48
	Pit 6 Landfill	Nitrate	Below background	
		Perchlorate	NA	1.8
		Tritium	2.7 × 10 ⁻⁶	NA
	HE Process Area	Carbon disulfide	NA	<1
		4-amino-2,6-dinitrotoluene	NA	NA

Table 1-19. List of Contaminants of Concern for which no baseline risk assessment was conducted in the SWRI (by media and OU). (Cont. Page 2 of 2)

Media	OU	Contaminant of concern	Health assessment based on PRGs and max. conc. ^a	
			Risk	Hazard Index
Ground water ^a (cont.)		Nitrate	NA	4.2
		Perchlorate	NA	2.8
	Building 850/Pits 3 & 5	Nitrate	NA	20
		Perchlorate	NA	<1
	Building 854	Nitrate	NA	18
		Perchlorate	NA	<1
		TCE	1.8×10^{-3}	12
		Tritium	$<10^{-6}$	NA
		Uranium-238	2.3×10^{-6}	NA
	Building 832 Canyon	Acetone	NA	<1
		Chloroform	1.9×10^{-4}	<1
		cis-1,2-DCE	NA	<1
		Nitrate	NA	50
		Perchlorate	NA	1.2
		PCE	9.1×10^{-6}	NA
		TCE	1.9×10^{-2}	811
	OU8: Building 801 dry well	Chloroform	1.5×10^{-5}	<1
		1,2-DCA	4.2×10^{-5}	<1
		Nitrate	NA	4.7
		TCE	3.8×10^{-6}	<1
	OU8: Building 833	Benzene	2.8×10^{-6}	NA
	OU8: Building 851	Freon 113	NA	<1
		PCE	1.5×10^{-6}	<1
		1,1,1-TCA	NA	<1
		TCE	1.7×10^{-6}	<1
		Uranium-238	1.2×10^{-6}	<1

Notes:

DCA = Dichloroethane.

DCE = Dichloroethylene.

NA = Not applicable.

OU = Operable unit.

PCE = Tetrachloroethylene.

PRG= Preliminary remediation goals.

SWFS = Site-Wide Feasibility Study.

SWRI = Site-Wide Remedial Investigation.

TCE = Trichloroethylene.

VOC = Volatile organic compound.

^a SWFS ground water risk and hazard index numbers are calculated from a historical maximum contaminant concentration in ground water at the source area.

Table 1-20. Summary of PRG evaluation of baseline human health effects at Site 300 Operable Units (OUs).

OU/release site	Media (Exposure pathways)	Contaminant of potential concern driving risk ^a	Baseline PRG risk ^b	Baseline PRG Hazard Index ^c
OU2: Building 834	Surface soil (outdoor adult onsite exposure from inhalation of resuspended particulates, dermal absorption, and incidental ingestion)	NA	1.6×10^{-7}	NA
	Subsurface soil (outdoor adult onsite exposure from inhalation, dermal absorption, and incidental ingestion of volatile organic compounds (VOCs) volatilized from subsurface soil to air)	VOCs (TCE)	4.2×10^{-5}	3.2×10^0
	Total Risk from outdoor exposures:		4.2×10^{-5}	3.2×10^0
	Ground water (theoretical adult onsite exposure from use of ground water as a water supply)	VOCs (Chloroform, TCE and PCE)	5.2×10^{-1}	3.1×10^4
	<i>Other relevant exposure pathways from previous risk assessments (presented for informational purposes only)</i>			
	Subsurface soil (indoor adult onsite exposure from inhalation of VOCs volatilized from subsurface soil to air inside Building 834D) ^d	VOCs (TCE and PCE)	1×10^{-3}	3.6×10^1
	Ground water (residential exposure from use of ground water from the perched aquifer from well CDF-1) ^d	NA	7×10^{-11}	2.8×10^{-6}
OU3: Pit 6 Landfill	Surface soil (outdoor adult onsite exposure from inhalation of resuspended particulates, dermal absorption, and incidental ingestion)	NA	1.6×10^{-9}	NA
	Subsurface soil (outdoor adult onsite exposure from inhalation, dermal absorption, and incidental ingestion of VOCs volatilized from subsurface soil to air)	NA	2.6×10^{-8}	1.4×10^{-3}
	Total Risk from outdoor exposures:		2.8×10^{-8}	1.4×10^{-3}
	Ground water (theoretical adult onsite exposure from use of ground water as a water supply)	VOCs (chloroform, 1,2-DCE, methylene chloride, PCE, TCE), bis (2-ethylhexyl) phthalate, perchlorate, silver, tritium	3.2×10^{-4}	3.0×10^1

Table 1-20. Summary of PRG evaluation of baseline human health effects at Site 300 Operable Units (OUs). (Page 2 of 7)

OU/release site	Media (Exposure pathways)	Contaminant of potential concern driving risk ^a	Baseline PRG risk ^b	Baseline PRG Hazard Index ^c
OU3: Pit 6 Landfill (cont.)	Surface water (theoretical adult onsite exposure from VOCs if Spring 7 used as a water supply) ^e	VOCs (chloroform, 1,2-DCA, methylene chloride, PCE, TCE, toluene)	1.3×10^{-4}	3.8×10^0
	<i>Other relevant exposure pathways from previous risk assessments (presented for informational purposes only)</i>			
	Surface water (outdoor adult onsite exposure from inhalation of VOCs volatilized from surface water to air in the vicinity of Spring 7) ^d	VOCs (1,2-DCA, chloroform, PCE, TCE)	4×10^{-5}	1.5×10^0
	Surface water (residential exposure from inhalation of VOCs volatilized from surface water to air in the vicinity of the SVRA residence pond) ^d	VOCs (Toluene)	3×10^{-6}	<1
	Ground water (residential exposure from use of the SVRA Ranger well (CARNRW2) as a water supply) ^d	NA	6×10^{-7}	1.3×10^{-2}
	Additive risk and HI for residential exposure associated with contaminated ground water from the Pit 6 Landfill OU ^d		4×10^{-6}	<1
OU4: High Explosives Process Area	Surface soil (outdoor adult onsite exposure from inhalation of resuspended particulates, dermal absorption, and incidental ingestion)	Thorium-228 (a single detection)	2.5×10^{-5}	NA
	Subsurface soil (outdoor adult onsite exposure from inhalation, dermal absorption, and incidental ingestion of VOCs volatilized from subsurface soil to air)	VOCs (Benzene, chloroform)	1.4×10^{-6}	4.1×10^{-2}
	Total Risk from outdoor exposures:		2.6×10^{-5}	4.1×10^{-2}
	Ground water (theoretical adult onsite exposure from use of ground water as a water supply)	VOCs (chloroform, 1,1-DCE, TCE), RDX, 2,6-dinitrotoluene, nitrate, nitrite, perchlorate, silver, tritium	1.4×10^{-3}	1.0×10^2
	Surface water (theoretical adult onsite exposure from VOCs if Spring 5 used as a water supply) ^e	VOCs (1,1,2-TCA, TCE)	9.7×10^{-5}	4.2×10^0

Table 1-20. Summary of PRG evaluation of baseline human health effects at Site 300 Operable Units (OUs). (Page 3 of 7)

OU/release site	Media (Exposure pathways)	Contaminant of potential concern driving risk ^a	Baseline PRG risk ^b	Baseline PRG Hazard Index ^c
HE Process Area (cont.)	<i>Other relevant exposure pathways from previous risk assessments (presented for informational purposes only)</i>			
	Ground water (residential exposure from use of ground water at hypothetical domestic water-supply well in Tnbs ₂ aquifer at southern site boundary)	VOCs (1,1-DCE, TCE) and RDX	1×10^{-5}	<1
	Surface water (outdoor adult onsite exposure from inhalation of VOCs volatilized from the surface of Spring 5) ^{d,e}	VOCs (TCE)	1×10^{-5}	<1
OU5: Building 850/Pits 3 & 5	Surface soil (outdoor adult onsite exposure from inhalation of resuspended particulates, dermal absorption, and incidental ingestion)	PCBs ^f	5.3×10^{-3}	NC
		CDDs/CDFs ^f	9.5×10^{-5}	NC
		Other	1.2×10^{-6}	4.5×10^{-5}
	Subsurface soil (outdoor adult onsite exposure from inhalation, dermal absorption, and incidental ingestion of tritium volatilized from subsurface soil to air)	NA	2.6×10^{-8}	NA
	Total Risk from outdoor exposures:		5.4×10^{-3}	4.5×10^{-5}
	Ground water (theoretical adult onsite exposure from use of ground water as a water supply)	VOCs (1,1-DCE, TCE), nitrate, tritium, uranium	1.2×10^{-2}	2.3×10^1
	Surface water (theoretical adult onsite exposure from tritium if Well 8 Spring used as a water supply) ^e	Tritium	1.2×10^{-3}	2.0×10^{-2}
	<i>Other relevant exposure pathways from previous risk assessments (presented for informational purposes only)</i>			
	Surface water (outdoor adult onsite exposure from inhalation of tritium volatilized from the surface of Well 8 Spring) ^d	Tritium	2.0×10^{-8}	<1
	Ground water residential exposure from use of contaminated ground water from Pit 5 at a hypothetical well located at the northeast Site 300 boundary) ^d	Chloroform	2.0×10^{-6}	<1

Table 1-20. Summary of PRG evaluation of baseline human health effects at Site 300 Operable Units (OUs). (Page 4 of 7)

OU/release site	Media (Exposure pathways)	Contaminant of potential concern driving risk ^a	Baseline PRG risk ^b	Baseline PRG Hazard Index ^c
OU6: Building 854	Surface soil (area wide outdoor adult onsite exposure from inhalation of resuspended particulates, dermal absorption, and incidental ingestion)	PCBs ^g	7.0×10^{-5}	1.2×10^{-1}
		Other	5.2×10^{-7}	2.9×10^{-3}
	Subsurface soil (area wide outdoor adult onsite exposure from inhalation, dermal absorption, and incidental ingestion of contaminants volatilized from subsurface soil to air)	TCE	5.0×10^{-6}	3.8×10^{-1}
	Total Risk from outdoor exposures:		8.0×10^{-5}	5.0×10^{-1}
	Subsurface soil (outdoor adult onsite exposure from inhalation of contaminants volatilized from subsurface soil to atmosphere in vicinity of Building 854F) ^g	Chloroform, 1,2-DCA	1.3×10^{-5}	NC
	Subsurface soil (outdoor adult onsite exposure from inhalation of contaminants volatilized from subsurface soil into Building 854F) ^g	Chloroform	8.7×10^{-6}	NC
	Subsurface soil (outdoor adult onsite exposure from inhalation of contaminants volatilized from subsurface soil into Building 854A) ^g	1,2-DCA	5.1×10^{-6}	NC
	Ground water (theoretical adult onsite exposure from use of ground water as a water supply)	TCE, bis (2-ethylhexyl) phthalate, uranium	1.9×10^{-3}	9.8×10^{-1}
	Surface water (theoretical adult onsite exposure from VOCs if Spring 10 used as a water supply) ^e	NA	6.2×10^{-7}	2.7×10^{-2}
OU 7 Building 832 Canyon	Surface soil (area wide outdoor adult onsite exposure from inhalation of resuspended particulates, dermal absorption, and incidental ingestion)	NA	1.6×10^{-10}	4.4×10^{-6}
	Subsurface soil (area wide outdoor adult onsite exposure from inhalation, dermal absorption, and incidental ingestion of VOCs volatilized from subsurface soil to air)	NA	4.2×10^{-7}	3.3×10^{-2}
	Total Risk from area wide outdoor exposures:		4.2×10^{-7}	3.3×10^{-2}
	Subsurface soil (indoor adult onsite exposure from inhalation of contaminants volatilized from subsurface soil to atmosphere inside Building 830) ^g	Vinyl chloride, TCE	2.8×10^{-4}	NC

Table 1-20. Summary of PRG evaluation of baseline human health effects at Site 300 Operable Units (OUs). (Page 5 of 7)

OU/release site	Media (Exposure pathways)	Contaminant of potential concern driving risk ^a	Baseline PRG risk ^b	Baseline PRG Hazard Index ^c
OU 7 Building 832 Canyon (cont.)	Subsurface soil (outdoor adult onsite exposure from inhalation of contaminants volatilized from subsurface soil to atmosphere inside Building 830) ^g	Vinyl chloride, chloroform, 1,2-DCA	1.0×10^{-5}	NC
	Subsurface soil (indoor adult onsite exposure from inhalation of contaminants volatilized from subsurface soil to atmosphere inside Building 832) ^g	1,2-DCP	2.8×10^{-6}	NC
	Subsurface soil (outdoor adult onsite exposure from inhalation of contaminants volatilized from subsurface soil to atmosphere in vicinity of Building 832) ^g	1,2-DCA	2.8×10^{-6}	NC
	Ground water (theoretical adult onsite exposure from use of ground water as a water supply)	VOCs (TCE, PCE)	1.9×10^{-2}	8.7×10^2
	Surface water (theoretical adult onsite exposure from VOCs if Spring 3 used as a water supply) ^e	VOCs (TCE, PCE)	1.3×10^{-4}	5.5×10^0
	<i>Other relevant exposure pathways from previous risk assessments (presented for informational purposes only)</i>			
	Surface water (adult onsite exposure from inhalation of contaminants volatilizing from Spring 3, assuming migration of contaminants from Building 830 to Spring 3) ^d	VOCs (TCE, PCE)	6.5×10^{-5}	2.3×10^0
OU8: Site 300 Release Sites:				
Building 801	Subsurface soil (outdoor adult onsite exposure from inhalation, dermal absorption, and incidental ingestion of VOCs volatilized from subsurface soil to air)	NA	1.4×10^{-9}	5.0×10^{-5}
	Ground water (theoretical adult onsite exposure from use of ground water as a water supply)	VOCs (chloroform, 1,2-DCA, TCE)	6.1×10^{-5}	3.1×10^1
Building 802	Subsurface soil (outdoor adult onsite exposure from inhalation, dermal absorption, and incidental ingestion of VOCs volatilized from subsurface soil to air)	NA	9.6×10^{-11}	NA
	Ground water (theoretical adult onsite exposure from use of ground water as a water supply)	Tritium	1.2×10^{-5}	NA

Table 1-20. Summary of PRG evaluation of baseline human health effects at Site 300 Operable Units (OUs). (Page 6 of 7)

OU/release site	Media (Exposure pathways)	Contaminant of potential concern driving risk ^a	Baseline PRG risk ^b	Baseline PRG Hazard Index ^c
Building 833	Surface soil (outdoor adult onsite exposure from inhalation, dermal absorption, and incidental ingestion of VOCs volatilized from subsurface soil to air)	NA	2.8×10^{-4}	6.5×10^{-4}
	Subsurface soil (outdoor adult onsite exposure from inhalation, dermal absorption, and incidental ingestion of VOCs volatilized from subsurface soil to air)	NA	2.9×10^{-8}	2.0×10^{-3}
	Ground water (theoretical adult onsite exposure from use of ground water as a water supply)	VOCs (benzene, TCE)	1.3×10^{-3}	5.8×10^1
	<i>Relevant exposure pathways from previous risk assessments (presented for comparison purposes only)</i>			
	Inhalation of contaminants volatilizing from subsurface soil to air inside Building 833 (adult onsite exposure)	VOCs (TCE, chloroform)	1×10^{-4}	<1
Building 845	Subsurface soil (outdoor adult onsite exposure from inhalation, dermal absorption, and incidental ingestion of VOCs volatilized from subsurface soil to air)	NA	1.3×10^{-12}	NA
	Ground water (theoretical adult onsite exposure from use of ground water as a water supply)	Uranium	7.3×10^{-6}	<1
Building 851	Subsurface soil (outdoor adult onsite exposure from inhalation, dermal absorption, and incidental ingestion of VOCs volatilized from subsurface soil to air)	NA	4.8×10^{-11}	2.1×10^{-1}
	Ground water (theoretical adult onsite exposure from use of ground water as a water supply)	VOCs (benzene, PCE, TCE), uranium	1.2×10^{-5}	3.0×10^{-1}
Locations not associated with release sites				
Spring 9	Surface water (theoretical adult onsite exposure from VOCs if Spring 9 used as a water supply) ^e	VOCs (TCE)	4.4×10^{-6}	1.9×10^{-1}

Notes and footnotes appear on the following page.

Table 1-20. Summary of PRG evaluation of baseline human health effects at Site 300 Operable Units (OUs). (Page 7 of 7)

Notes:**CDDs = Chlorinated dibenzo-p-dioxins.****CDFs = Chlorinated dibenzofurans.****DCA = Dichloroethane.****HI = Hazard Index.****NA = Not applicable or not available.****NC = Not calculated.****OU = Operable unit.****PCBs = Polychlorinated biphenyls.****PCE = Tetrachloroethylene.****RDX = Research Department Explosive.****TCE = Trichloroethylene.****VOCs = Volatile organic compounds.**

- ^a Primary COC driving risk indicates contaminants for which the contaminant specific risk exceeded 10^{-4} hazard quotient exceeded one. If not specific contaminant is indicted, no contaminant-specific risk and hazard exceeded 10^{-6} or one, respectively. Rather the sum of the risk and/or hazard for all contaminants caused the risk total to exceed 10^{-6} and/or hazard total to exceed one.
- ^b Risk number was derived from comparison to the appropriate cancer PRG. The maximum historical concentration of each contaminant was divided by the contaminant-specific PRG and multiplied times 10^{-6} to derive the risk number.
- ^c The hazard quotient was derived from comparison to the appropriated noncancer PRG. Maximum historical concentration of each contaminant was divided by the contaminant-specific PRG to derive the hazard quotient.
- ^d From the baseline human health assessment presented in the SWRI.
- ^e There is currently no surface flow for Springs 5 and 7. For all springs, the only existing actual pathway to adults on site is through the inhalation pathway.
- ^f From toxicity equivalent calculations presented in the Building 850 SWRI addendum. These are PRG calculations, therefore, we did not repeat the PRG/toxicity equivalent calculations for this SWFS. They are appropriate to add to other PRG results.
- ^g From toxicity equivalent presented in the Building 832 Canyon Characterization Summary Report. For these, therefore, ambient concentrations (either measured or estimated from flux chamber measurements) were compared to the contaminant-specific PRG for ambient air. They are appropriate to add to other PRG results.

Table 1-21. Baseline Ecological Risk Assessment Summary for Site 300.

Operable unit (OU)	Risk assessment done/document	Ecological risk assessment		
		Exposure pathway evaluated	Contaminant of potential concern evaluated	Impacts
OU2: Building 834	Yes: SWRI Chapters 6 and 10	<ul style="list-style-type: none"> • Inhalation of contaminated, resuspended soil particles • Inhalation of volatile organic compound (VOC) vapors that diffuse into the air inside subsurface burrows • Inhalation of contaminants volatilized from subsurface soil to atmosphere • Incidental ingestion of contaminants in surface and subsurface soils 	Acetone, TCE, benzene, toluene, ethylbenzene, total xylenes (BTEX), PCE, freon 11, freon 113, cadmium	<ul style="list-style-type: none"> • <i>The Hazard Index (HI) for inhalation, and combined oral and inhalation, for individual adult and juvenile ground squirrels and adult and juvenile kit fox exceeds 1 for TCE, PCE, and total VOCs. However, there is no unacceptable risk to the ground squirrel population (Webster-Scholten, 1994, and Section 1.5.3.1).</i> • No unacceptable risk from VOCs to adult or juvenile deer. • <i>HI for combined oral and inhalation of individual adult ground squirrels and adult kit fox, and for individual adult and juvenile deer exceeds 1 for cadmium. However, there is no unacceptable risk to the ground squirrel and deer populations (Webster-Scholten, 1994, and Sections 1.5.3.1 and 1.5.3.2, respectively).</i>
OU3: Pit 6 Landfill	Yes: SWRI Chapters 6 and 12	<ul style="list-style-type: none"> • Inhalation of contaminated, resuspended soil particles • Inhalation of VOC vapors that diffuse into the air inside subsurface burrows • Inhalation of contaminants volatilized from subsurface soil to atmosphere • Incidental ingestion of contaminants in surface and subsurface soils • Inhalation of VOCs volatilized from surface water to air • Direct ingestion of surface water containing VOCs 	HMX, RDX, freon 11, 1,1,1-TCA, total 1,2-DCA, chloroform, methylene chloride, TCE, PCE, freon 113, cis-1,2-DCE, trans-1,2-DCE, total xylenes, ethylbenzene, toluene, bis(2-ethylhexyl)phthalate, butyl benzyl phthalate, phenolics, acetone, carbon disulfide	<ul style="list-style-type: none"> • No unacceptable risk from VOCs or HE to adult or juvenile deer. • No unacceptable risk from HE to adult or juvenile squirrels or kit fox. • <i>HI for inhalation, and combined oral and inhalation for individual juvenile ground squirrels and juvenile kit fox exceeds 1 for PCE, TCE, and total VOCs. However, there is no unacceptable risk to the ground squirrel population (Webster-Scholten, 1994, and Section 1.5.3.1).</i> • <i>HI for inhalation, and combined oral and inhalation for adult kit fox exceeds 1 for TCE and total VOCs.</i> • <i>HI for inhalation, and combined oral and inhalation for individual adult squirrels exceeds 1 for total VOCs. However, there is no unacceptable risk to the ground squirrel population (Webster-Scholten, 1994, and Section 1.5.3.1).</i>

Table 1-21. Baseline Ecological Risk Assessment Summary for Site 300. (Cont. Page 2 of 6)

Operable unit (OU)	Risk assessment done/document	<u>Ecological risk assessment</u>		
		Exposure pathway evaluated	Contaminant of potential concern evaluated	Impacts
OU4: HE Process Area	Yes: SWRI Chapters 6 and 13	<ul style="list-style-type: none"> • Inhalation of contaminated, resuspended soil particles • Inhalation of VOC vapor that diffuses into the air of subsurface burrows • Inhalation of contaminants volatilized from subsurface soil to atmosphere • Incidental ingestion of contaminants in surface and subsurface soil • Inhalation of contaminants volatilized from surface water to air • Direct ingestion of surface water containing copper and VOCs • Inhalation of resuspended particulates contaminated with high explosive (HE) compounds in the air of subsurface burrows 	HMX, RDX, methylene chloride, PCE, toluene, TCE, freon 11, total xylenes, 1,1-DCE, cis-1,2-DCE, 1,2-DCPa, 1,1,2-TCA, chloroform, acetone, copper, cadmium, zinc	<ul style="list-style-type: none"> • No unacceptable risk from VOCs to adult or juvenile squirrels, kit fox, or deer. • No unacceptable risk from HE compounds to adult or juvenile squirrels, kit fox, or deer. • <i>HI for combined oral and inhalation risk for individual adult squirrels, and for individual adult and juvenile deer exceeds 1 for cadmium, and for the sum of all metals. However, there is no unacceptable risk to the ground squirrel and deer populations (Webster-Scholten, 1994, and Sections 1.5.3.1 and 1.5.3.1, respectively).</i> • Except for cadmium, no unacceptable risk from individual metals to adult or juvenile squirrels or deer. • No unacceptable risk from any metals to adult or juvenile kit fox. • <i>The Toxicity Quotient (TQ) at Spring 5 exceeds 1 for copper when using the conservative California Applied Action Levels (AALs), but is below 1 when using the Federal Ambient Water Quality Criteria (AWQC). New data indicate that there is no unacceptable risk from Spring 5 (Section 1.5.3.2).</i>

Table 1-21. Baseline Ecological Risk Assessment Summary for Site 300. (Cont. Page 3 of 6)

Operable unit (OU)	Risk assessment done/document	<u>Ecological risk assessment</u>		
		Exposure pathway evaluated	Contaminant of potential concern evaluated	Impacts
OU5: Building 850/Pits 3 & 5	Yes: SWRI Chapters 6 and 11	<ul style="list-style-type: none"> Inhalation of tritium vapor that diffuses into the air of subsurface burrows Inhalation of tritium vapor from subsurface soil to atmosphere Inhalation of tritium water vapor evaporating from spring water into air Inhalation of contaminated, resuspended particles. Inhalation of uranium-238 contaminated, resuspended soil particles in subsurface burrows Direct ingestion of contaminants of surface water Incidental ingestion of contaminants in surface and subsurface soil Radiological impacts to vegetation 	Tritium, beryllium, cadmium, copper, zinc, uranium-238, freon 11, freon 113, RDX	<ul style="list-style-type: none"> No unacceptable risk from radiological exposure to adult or juvenile ground squirrels, deer, or kit fox. HI for combined oral and inhalation risk for individual adult squirrels, and for individual adult and juvenile deer exceeds 1 for cadmium, and for the sum of VOCs, metals, and HE. However, there is no unacceptable risk to the ground squirrel and deer populations (Webster-Scholten, 1994, and Sections 1.5.3.1 and 1.5.3.2, respectively). No unacceptable risk from individual VOCs to adult or juvenile ground squirrels, deer, or kit fox. Except for cadmium, no unacceptable risk from individual metals to adult or juvenile squirrels or deer. No unacceptable risk from any metals to adult or juvenile kit fox. No unacceptable risk from HE to adult or juvenile ground squirrels, deer, or kit fox. The HI from tritium or uranium-238 is less than 1 for native perennial bunch grasses. The TQ for tritium and uranium-238 is below 1 for Well Spring 8 and Spring 6. The TQ at Spring 6 exceeds 1 for copper when using the Federal AWQC, and exceeds 1 for copper and zinc when using the conservative California AALs. New data indicate that there is no unacceptable risk from Spring 6 (Section 1.5.3.1).

Table 1-21. Baseline Ecological Risk Assessment Summary for Site 300. (Cont. Page 4 of 6)

Operable unit (OU)	Risk assessment done/document	<u>Ecological risk assessment</u>		
		Exposure pathway evaluated	Contaminant of potential concern evaluated	Impacts
OU6: Building 854	Yes: SWRI Chapters 6 and 11, Building 854 Characterization Summary Report	No specific data exist. The affected portion of this OU is paved and thus does not provide sufficient ecological habitat.	—	—
OU7: Building 832 Canyon	Some: SWRI (Building 830) Chapters 6 and 9 and Building 832 Canyon Characterization Summary Report	<ul style="list-style-type: none"> • Inhalation of VOC vapors that diffuses into air of subsurface burrows • Inhalation of contaminants volatilized from surface water to air • Direct ingestion of TCE and PCE from surface water • Incidental ingestion of contaminants in surface soil and TCE in subsurface soil • Inhalation of resuspended soil particles contaminated with VOCs 	TCE, PCE, toluene, acetone, freon 11, freon 113, 1,1,1-TCA	<ul style="list-style-type: none"> • No impact from VOCs to adult or juvenile ground squirrels, deer, or kit fox.
OU8: Site 300 Release Sites				
Building 801 Dry Well	Yes: SWRI Chapters 6 and 11	<ul style="list-style-type: none"> • Inhalation of contaminated, resuspended soil particles • Incidental ingestion of contaminants in surface soil 	Beryllium, cadmium, copper, zinc, uranium-238, RDX, freon 11, freon 113	<ul style="list-style-type: none"> • No unacceptable risk from radiological exposure to adult or juvenile ground squirrels, deer, or kit fox. • No unacceptable risk from individual VOCs to adult or juvenile ground squirrels, deer, or kit fox. • HI for combined oral and inhalation risk for individual adult squirrels, and for individual adult and juvenile deer exceeds 1 for cadmium, and exceeds 1 for the sum of VOCs, metals, and HE. However, there is no unacceptable risk to the ground squirrel and deer populations (Webster-Scholten, 1994, and Sections 1.5.3.1 and 1.5.3.1, respectively)

Table 1-21. Baseline Ecological Risk Assessment Summary for Site 300. (Cont. Page 5 of 6)

Operable unit (OU)	Risk assessment done/document	<u>Ecological risk assessment</u>		
		Exposure pathway evaluated	Contaminant of potential concern evaluated	Impacts
Building 801 Dry Well (cont.)				<ul style="list-style-type: none"> • Except for cadmium, no unacceptable risk from individual metals to adult or juvenile squirrels or deer. • No unacceptable risk from any metals to adult or juvenile kit fox. • No unacceptable risk from RDX to adult or juvenile ground squirrels, deer, or kit fox.
Building 802 Firing Table	Yes: SWRI Chapters 6 and 11	<ul style="list-style-type: none"> • Inhalation of vapor that diffuses into the air of subsurface burrows • Inhalation of vapor that diffuses into the air from contaminated subsurface soil • Incidental ingestion of contaminants in subsurface soil • Radiological impacts to vegetation 	Tritium, uranium-238	<ul style="list-style-type: none"> • No unacceptable risk from radiological exposure to adult or juvenile ground squirrels, deer, or kit fox. • No unacceptable risk from tritium to native perennial bunch grasses.
Building 812 Waste Water Outflow	No; site not fully characterized	—	—	—
Building 833 Area	Yes: SWRI Chapters 6 and 9	<ul style="list-style-type: none"> • Inhalation of resuspended soil particles contaminated with VOCs • Incidental ingestion of contaminants in surface soil 	TCE, PCE, toluene, acetone, freon 11, freon 113, 1,1,1-TCA	<ul style="list-style-type: none"> • No impact from VOCs to adult or juvenile ground squirrels, deer, or kit fox.
Building 845 Firing Table	Yes: SWRI Chapters 6 and 11	<ul style="list-style-type: none"> • Incidental ingestion of contaminants in surface soil • Inhalation of contaminated, resuspended soil particles 	Beryllium, cadmium, copper, zinc, RDX, freon 11, freon 113, uranium-238	<ul style="list-style-type: none"> • No risk calculated for this Building 845 area, although to be conservative, this data was added to the other individual calculations throughout the East/West Firing Area.
Building 851 Firing Table	No; site not fully characterized	<ul style="list-style-type: none"> • Incidental ingestion of contaminants in surface soil • Inhalation of contaminated, resuspended soil particles 	Tritium, uranium-238	<ul style="list-style-type: none"> • No unacceptable risk from radiological exposure to adult or juvenile ground squirrels, deer, or kit fox.

Table 1-21. Baseline Ecological Risk Assessment Summary for Site 300. (Cont. Page 6 of 6)

Operable unit (OU)	Risk assessment done/document	Exposure pathway evaluated	<u>Ecological risk assessment</u>	
			Contaminant of potential concern evaluated	Impacts
Building 865 (ATA)	No; site not fully characterized	—	—	—
Sandia Test Site	No; site not fully characterized	—	—	—

Notes:

AAL = Applied Action Levels
 AWQC = Ambient Water Quality Criteria.
 BTEX = Benzene, toluene, ethylbenzene, total xylenes.
 DCA = Dichloroethane.
 DCPa = Dichloropropane.
 FS = Feasibility Study.
 GSA = General Services Area.
 HE = High explosive.
 HI = Hazard index.
 OU = Operable unit.
 ROD = Record of Decision.
 TCA = Trichloroethane.
 TQ = Toxicity Quotient.
 VOCs = Volatile organic compounds.

Table 1-22. Summary of bioassay results of spring samples collected during the summer of 1994.

Summary of <i>Ceriodaphnia dubia</i>* bioassay					
Spring	IC₅₀^a %	IC₁₅^b %	NOEC^c %	TU_c^d	Acute survival (%)
GEOCRK	>100	>100	100	1.0	100
Spring 5^e	97.5	64.3	50	2.0	100
Spring 6	>100	>100	100	1.0	100
NC2-23^f	65.9	10.1	25	4.0	100

Summary of <i>Ceriodaphnia dubia</i>* bioassay				
Spring	IC₅₀^a %	IC₁₅^b %	NOEC^c %	TU_c^d
GEOCRK	>100	>100	100	1.0
Spring 5^e	88.1	36.4	50	2.0
Spring 6	>100	>100	100	1.0
NC2-23^f	27.3	12.9	12.5	8.0

^a Inhibitory Concentration (IC) for 50% of the organisms.

^b Inhibitory Concentration (IC) for 15% of the organisms.

^c No Observable Effect Concentration (NOEC).

^d Toxic Unit (TU_c) = 100%/NOEC.

^e This spring is sampled by well W-817-03A.

^f This well samples the same water found in Spring 6.

* *Ceriodaphnia dubia* is a water flea.

* *Selenastrum capricornutum* is a fresh water algae.

Table 1-23. Screening out of contaminants of potential concern (COPCs) in ground and surface water.

OU	Contaminant of potential concern	No. of detections/ No. of samples	Maximum concentration	Rationale for screening out contaminant
OU3: Pit 6 Landfill	Bis (2-ethylhexyl) phthalate	7 of 79	70 µg/L	Phthalates detected in upgradient well. Potential lab contaminant. Concentration less than 10 times (10X) multiple of blank (EPA 10X Rule-100 µg/L).
	Butylbenzyl-phthalate	2 of 47	78 µg/L	Phthalates detected in upgradient well. Potential lab contaminant. Concentration less than 10X multiple of blank (EPA 10X Rule-100 µg/L).
	Carbon disulfide	10 of 235	3 µg/L	Carbon disulfide has not been detected in ground water since April 1992 indicating that the compound is no longer present in ground water. This compound is monitored as part of the Pit 6 Detection Monitoring Program which will indicate any new releases of carbon disulfide.
	Ethylbenzene	9 of 356	7.3 µg/L	Not detected in ground water since 1992. Each well with detections has had multiple non-detects since.
	Methylene Chloride	19 of 919	160 µg/L	Common laboratory contaminant. Numerous non-detects (generally <0.5 µg/L) have followed every reported detection.
	Phenolics	32 of 263	90 µg/L	Two of wells in which phenolics detected were upgradient of source. Phenolics reported in some blanks, but have not been detected anywhere since change in analytical method.
	Radium-226	63 of 271	1.3 pCi/L	Decay product of naturally occurring Uranium-238 (U-238). Not a constituent of concern in the Compliance Monitoring Program. Detected in upgradient well K6-04 at concentrations up to 0.8 pCi/L. Believed to be of natural origin.
	Radium-228	4 of 35	1.12 pCi/L	Decay product of naturally occurring Thorium-232 (Th-232). Not a constituent of concern in the Compliance Monitoring Program. Believed to be of natural origin.

Table 1-23. Screening out of contaminants of potential concern (COPCs) in ground and surface water. (Cont. Page 2 of 9)

OU	Contaminant of potential concern	No. of detections/ No. of samples	Maximum concentration	Rationale for screening out contaminant
OU3: Pit 6 Landfill (cont.)	Silver	11 of 365	3.5 mg /L	Silver has been detected in five wells. Most recent detections (5/96) in two wells at concentration slightly above background; one upgradient of source. No detections in wells since 5/96.
	Tetrahydrofuran	1 of 1	2 µg/L	Insufficient data. Tetrahydrofuran is present in PVC pipe adhesive and/or tape. Contaminant in sample may have been the result of contamination contributed by well pipe.
	Total xylenes	28 of 306	15 µg/L	Not detected in ground water since 1991. All wells have reported multiple non-detects since. Two thirds of reported detections occur during one suspect period.
	Chloroform, in surface water (BC6-13)	1 of 23	5.1 µg/L	Not detected in surface water since 1987. BC6-13 has reported multiple non-detects since.
	1,2-DCA, in surface water (BC6-13)	2 of 23	3.5 µg/L	Not detected in surface water since 1988. BC6-13 has reported multiple non-detects since.
	Methylene chloride, in BC6-13	1 of 23	8.9 µg/L	Not detected in surface water since 1987. BC6-13 has reported multiple non-detects since.
	Toluene, in surface water (BC6-13)	1 of 13	0.9 µg/L	Not detected in surface water since 1991. BC6-13 has reported multiple non-detects since.
	Total xylenes, in surface water (BC6-13)	1 of 13	1.6 µg/L	Not detected in surface water since 1991. BC6-13 has reported multiple non-detects since.
OU4: HE Process Area Bldg. 815 area	Phenolics	10 of 39	330 µg/L	Not reported in ground water since analyses changed from EPA 420.1 to 625, in 1995/6. Detections in blanks of 420.1 method.
	Tetrahydrofuran	1 of 1	8 mg/L	Insufficient data. Detected only once in one offsite private well (GALLO1). Tetrahydrofuran is present in PVC pipe adhesive and/or tape. Contaminant in sample may have been the result of contamination contributed by well pipe.

Table 1-23. Screening out of contaminants of potential concern (COPCs) in ground and surface water. (Cont. Page 3 of 9)

OU	Contaminant of potential concern	No. of detections/ No. of samples	Maximum concentration	Rationale for screening out contaminant
Bldg. 815 area (cont.)	Tritium	58 of 267	940 pCi/L	Only reported activity above background was in 1987, followed by numerous below background results.
	1,1,2-TCA, in surface water (W-817-03A)	2 of 56	3.3 µg/L	Not detected in surface water since 1992. W-817-03A has reported multiple non-detects since.
HE Lagoons	Beryllium	23 of 788	0.018 mg /L	Detected only once, in one well, at concentration above background in 1993.
	1,3-dinitrobenzene	3 of 67	0.37 µg/L	All reported detections came on same day, whereas previous and subsequent analyses report ND
	2,6-dinitrotoluene	6 of 147	1.2 µg/L	Duplicate analyses contradict detections. Numerous non-detects in all wells.
	2-amino-4,6-dinitrotoluene	4 of 67	0.71 µg/L	Duplicate analyses contradict detections. Numerous non-detects in all wells.
	Radium-228	7 of 25	5.12 pCi/L	Radium-228 was detected in wells which monitor the HE Burn Pits. Radium-228 will be monitored as part of the Post-Closure Plan for the HE Burn Pits. Background levels will be developed for Radium-228 by the time the Post-Closure Plan monitoring is in place. Believed to be of natural origin, it will not be considered as a COC at this time.
	Silver	24 of 735	0.020 mg /L	Detected in 6 wells including 1 upgradient well. Maximum concentration detected in 10/89. Not detected in wells since 7/95. Detected in HE surface impoundment detection wells; continued monitoring as part of WDR 96-248.
OU5: B850/ Pits 3 & 5	Benzoic Acid	3 of 74	120 µg/L	Detected in one well upgradient of Pit 1. Will be investigated as part of Building 865 area characterization. Outside area of contamination from, or pumping for, the B850 OU. Benzoic acid would not be affected by any OU 5 remediation.

Table 1-23. Screening out of contaminants of potential concern (COPCs) in ground and surface water. (Cont. Page 4 of 9)

OU	Contaminant of potential concern	No. of detections/ No. of samples	Maximum concentration	Rationale for screening out contaminant
OU5: B850/ Pits 3 & 5 (cont.)	Bismuth	57 of 62	0.6 µg /L	Detected in ground water sample from upgradient well NC7-44 at 0.004 mg/L and in a water sample from deep/confined well NC7-69 at 0.004 mg/L. Water from well NC7-69 is free of tritium thus demonstrating this well is isolated from anthropogenic contaminants.
	Carbon disulfide	5 of 220	9 µg/L	No carbon disulfide has been detected in ground water samples since 1992 indicating that this compound, if it once occurred as a ground water contaminant, is no longer present.
	Freon 113	141 of 1,698	380	Freon 113 has been detected in K1 wells in the Pit 1 area. The highest concentrations have been detected in wells upgradient from Pit 1. The freon 113 in ground water is believed to emanate from releases in the Building 865 (Advanced Test Accelerator) area and not from releases at Pit 1. Because the B865 area will be the subject of full characterization subsequent to this FS, and freon would not be affected by any OU 5 remediation, freon 113 is not included as a COC for the B850/Pits 3 & 5 OU.
	Phenolics	55 of 497	460 µg/L	Potential lab contaminant. Not a constituent of concern in the Compliance Monitoring Program. No phenolics detected since change in analytical method.
	Radium-226	529 of 1,165	624 pCi/L	Radium-226 (Ra-226) is a daughter product of U-238. One detection at concentration above the statistical limit in 1995. Monitoring conducted since indicates activities are below the statistical limit established for Radium-226. Monitoring continues under Pits 1 & 7 Compliance Monitoring Program.

Table 1-23. Screening out of contaminants of potential concern (COPCs) in ground and surface water. (Cont. Page 5 of 9)

OU	Contaminant of potential concern	No. of detections/ No. of samples	Maximum concentration	Rationale for screening out contaminant
OU5: B850/Pits 3 & 5 (cont.)	Radium-228	17 of 78	14.2 pCi/L	Naturally occurring decay product of Th-232. A routine sample from upgradient well K7-06 contained 14.2 pCi/L. The duplicate sample collected on the same day (7/21/98) contained 1.0 pCi/L. Not a constituent of concern in the Compliance Monitoring Program. Believed to be of natural origin.
	Silver	33 of 1,015	0.60 mg /L	Detected in 28 wells at concentration above background. Monitored as part of Waste Discharge Requirements (WDR) 96-248. Not detected above background concentration since 1985, when silver was also reported above background in upgradient well K7-06.
	Thorium-230	248 of 510	91.5 pCi/L	Part of the Uranium-234 decay series. Detected in upgradient well K7-06 at a maximum concentration of 17 pCi/L and at far downgradient well NC7-47 at a concentration of 39.5 pCi/L. Not a constituent of concern in the Compliance Monitoring Program.
	PCE in Spring 6	1 of 13	0.57 µg/L	Not detected in surface water since 1995. Spring 6 has reported multiple non-detects since.
	TCE in Spring 6	1 of 13	0.76 µg/L	Not detected in surface water since 1995. Spring 6 has reported multiple non-detects since.
OU6: Bldg. 854	Beryllium	2 of 8	0.092 mg /L	Detected twice in one well at concentrations above background. We will continue monitoring.
	Bis (2-ethylhexyl) phthalate	1 of 14	8.6 µg/L	Detected once in one well. Potential lab contaminant.
	Dimethyl-phthalate	1 of 14	9 µg/L	Detected once in one well. Potential lab contaminant.
	Phenolics	1 of 1	9 µg/L	Potential lab contaminant. Not enough data to determine source. Reported before change of analytical method.

Table 1-23. Screening out of contaminants of potential concern (COPCs) in ground and surface water. (Cont. Page 6 of 9)

OU	Contaminant of potential concern	No. of detections/ No. of samples	Maximum concentration	Rationale for screening out contaminant
OU6: Bldg. 854 (cont.)	Toluene	3 of 104	14 µg/L	Pattern of reported detections suggests analytical laboratory or field contamination. Reported detections followed by numerous non-detects.
	TCE in Springs 10 and 11	4 of 21	1.0 µg/L	Not detected in surface water since 1996. Springs have reported multiple non-detects since.
OU7: Bldg. 832 Canyon	Toluene	2 of 66	4.8 µg/L	The only detections of toluene occurred in splits of a single sample from one well (W-830-11) in June 1992. No toluene has been detected in that or any other well since indicating that it is not currently present.
	cis-1,2-DCE, in Spring 3	1 of 10	2.2 µg/L	Not detected in surface water since 1996. Spring 3 has reported multiple non-detects since.
	trans-1,2-DCE, in Spring 3	1 of 11	0.53 µg/L	Not detected in surface water since 1996. Spring 3 has reported multiple non-detects since.
	PCE, in Spring 3	1 of 21	3.7 µg/L	Not detected in surface water since 1985. Spring 3 has reported multiple non-detects since.
OU8: Site 300 Bldg. 801	Acetone	5 of 68	14 µg/L	Not detected since 1990. All reported occurrences on the same day, in wells with long histories of no detections. Potential lab contamination.
	Ethylbenzene	3 of 77	2.1 µg/L	Not detected since 1990. All reported occurrences on the same day, in wells with long histories of no detections. Potential lab contamination.
	Radium-226	14 of 44	91.3 pCi/L	Naturally occurring decay product of U-238. Believed to be of natural origin.
	Radium-228	1 of 14	0.68 pCi/L	Naturally occurring decay product of Th-232. Believed to be of natural origin.

Table 1-23. Screening out of contaminants of potential concern (COPCs) in ground and surface water. (Cont. Page 7 of 9)

OU	Contaminant of potential concern	No. of detections/ No. of samples	Maximum concentration	Rationale for screening out contaminant
Bldg. 801 (cont.)	Silver	1 of 46	0.5 µg/L	Reported once in one well at concentration just above background. Monitored as part of WDR 96-248. Believed to be of natural origin.
	Toluene	6 of 77	4 µg/L	No detections reported since 1990. Pattern of reported detections suggests analytical laboratory or field contamination.
	Total xylenes	7 of 69	7.4 µg/L	No detections reported since 1990. Pattern of reported detections suggests analytical laboratory or field contamination.
Building 833	Carbon disulfide	1 of 6	0.7 µg/L	Detected once in one well at just above detection limit. Not enough data to determine source.
Building 845	Carbon disulfide	1 of 33	2 µg/L	Potential lab contaminant. Detected once in one well.
	Phenolics	5 of 9	16 µg/L	Not detected since analyses changed from EPA 420.1 to 625, in 1995. Detections in blanks of 420.1 method.
	Radium-226	9 of 41	0.39 pCi/L	Naturally-occurring decay product of U-238. Believed to be of natural origin.
	Silver	7 of 48	2.1 µg/L	Detected in all four B845 wells; however, highest concentration in two cross/upgradient wells from the source area, indicating that detection is not the result of a release.
	Toluene	1 of 39	1 µg/L	Toluene was detected in one sample from one well in the B845 area. Toluene was not detected any an subsequent samples collected in the following 6 years. The data support the conclusion that toluene is not currently present in ground water.
Building 851	Acetone	2 of 26	11 µg/L	Not detected since 1991, and then during a period where acetone detections are suspect. Multiple non-detects observed after each of the two reported detections.

Table 1-23. Screening out of contaminants of potential concern (COPCs) in ground and surface water. (Cont. Page 8 of 9)

OU	Contaminant of potential concern	No. of detections/ No. of samples	Maximum concentration	Rationale for screening out contaminant
Building 851 (cont.)	Benzene	1 of 28	2 µg/L	Benzene was detected once, in one well (W-851-05) in the B851 area in July 1991. The sample duplicate was reported as non-detect (<0.5 µg/L). No benzene was detected in any other well or in any samples from well W-851-01 above the detection limit (0.5 µg/L) in subsequent years.
	Radium-226	2 of 5	1.3 pCi/L	Naturally-occurring decay product of U-238. Maximum concentration was detected in water sample from W-851-05 (upgradient well). Believed to be of natural origin.
	Radium-228	3 of 5	3.5 pCi/L	Naturally-occurring decay product of Th-232. Maximum concentration was detected in water from well W-851-05 (upgradient well). Believed to be of natural origin.
	Tetrahydrofuran	1 of 1	30 µg/L	Insufficient data. Tetrahydrofuran is present in PVC pipe adhesive and/or tape. Contaminant present in sample may have been result of contamination contributed by well pipe.
	Toluene	3 of 28	3 µg/L	Toluene was detected one time in three wells. All detections occurred in 1991 with no toluene reported in any subsequent sampling of the B851 wells. Data supports that toluene is not currently present in ground water.
	Total xylenes	1 of 27	3 µg/L	Xylenes were detected only once in one well in April 1991. Five subsequent samples did not contain xylenes above 0.5 µg/L method detection limit. Data supports that xylenes are not currently present in ground water.
Springs unrelated to release sites				
Spring 9	1,2- DCE (total), in surface water	1 of 4	6.1 µg/L	Not detected in surface water since 9/9/93. Spring 9 has reported two subsequent non-detects.

Table 1-23. Screening out of contaminants of potential concern (COPCs) in ground and surface water. (Cont. Page 9 of 9)

OU	Contaminant of potential concern	No. of detections/ No. of samples	Maximum concentration	Rationale for screening out contaminant
Spring 9 (cont.)	TCE, in surface water	1 of 5	7.0 µg/L	Not detected in surface water since 9/9/93. Spring 9 has reported three subsequent non-detects.
Spring 12	1,2- DCE (total), in surface water	1 of 5	3.2 µg/L	Not detected in surface water since 9/9/93. Spring 12 has reported two subsequent non-detects.
	TCE, in surface water	1 of 6	1.0 µg/L	Not detected in surface water since 9/9/93. Spring 12 has reported three subsequent non-detects.

Notes:

DCA = Dichloroethane

DCE = Dichloroethylene

EPA = U.S. Environmental Protection Agency.

HE = High Explosives.

OU = Operable Unit.

PCE = Tetrachloroethylene

PVC = Polyvinyl Chloride.

TCA = Trichloroethane

TCE = Trichloroethylene

Th-232 = Thorium-232.

U-238 = Uranium-238.

WDR = Waste Discharge Requirements.

Table 1-24. Screening out of contaminants of potential concern (COPCs) in soil/rock (surface and subsurface).

OU/Media	Contaminant of potential concern	No. of detections/No. of samples	Maximum concentration (mg/kg)	Rationale for screening out contaminant
OU2: Building 834				
Subsurface soil/rock	HMX	1 of 18	0.0002	All detections of HMX and RDX were in 1 borehole (834-T3) located in the perched horizon 1,200 ft down gradient of B834. Not enough data on possible source of HMX. No high explosive (HE) compounds in ground water or other soil samples at B834.
	RDX	2 of 18	0.02	
OU3: Pit 6 Landfill				
Surface soil	HMX	1 of 6	0.014	Both detected in one surface soil sample (3SS-52-01) in November 1991. From Site-Wide Remedial Investigation (SWRI) Chapter 12-4.3: “Two HE compounds were reported in a surface soil sample collected in the vicinity of Spring 12. However, the analytical laboratory was unable to complete confirmatory analyses for the presence of HMX and RDX due to equipment failure (Clarkson and Cupps, 1992). As a result, the reported HE detections are suspect.”
	RDX	1 of 6	0.044	
OU4: HE Process Area				
Subsurface soil/rock	Silver	3 of 98	9.0	Residential soil Preliminary Remediation Goal (PRG) is 370 mg/kg. Insufficient data to determine background. Source is not clear; could be natural constituent of soil/bedrock.

Table 1-24. Screening of contaminants of potential concern (COPCs) in soil/rock (surface and subsurface). (Cont. Page 2 of 5)

OU/Media	Contaminant of potential concern	No. of detections/No. of samples	Maximum concentration (mg/kg)	Rationale for screening out contaminant
OU4: HE Process Area (cont.)				
Subsurface soil/rock	Tetrahydrofuran	9 of 9	1.0	Detections in soil samples collected (August 1986) from borehole 827-C2. A total of 9 samples were collected from 1.8 to 30.8 feet. All detected tetrahydrofuran at concentrations ranging from 0.6 to 1.0 mg/kg. Samples may have been wrapped with duct tape and the glue on the tape may contain tetrahydrofuran
	Radium 228	4 of 4	1.54 pCi/g	Decay product of naturally occurring Thorium (Th) -232. Industrial soil PRG is 13. Believed to be of natural origin.
Surface soil	Silver	1 of 29	5.0	Residential soil PRG is 370 mg/kg. Insufficient data to determine background. Source is not clear; could be natural constituent of soil/bedrock.
	Thorrium-228	1 of 1	3.78 pCi/g	Insufficient data to determine local background. Not a substance suspected to have been released.
OU6: Building 854				
Surface soil	Silver	1 of 39	42	Residential soil PRG is 370 mg/kg. Insufficient data to determine background. Source is not clear; could be natural constituent of soil/bedrock.
	Uranium-238	2 of 2	1.08 pCi/g	Although the uranium-235/uranium-238 (U235/U238) mass ratio analysis indicated that one sample had a mass ratio slightly below that of natural uranium, total sample activities were below background.

Table 1-24. Screening of contaminants of potential concern (COPCs) in soil/rock (surface and subsurface). (Cont. Page 3 of 5)

OU/Media	Contaminant of potential concern	No. of detections/No. of samples	Maximum concentration (mg/kg)	Rationale for screening out contaminant
OU6: Building 854 (cont.)				
Subsurface soil	Uranium-238	6 of 6	1.8 pCi/g	Although the U235/U238 mass ratio analysis indicated that one sample had a mass ratio slightly below that of natural uranium, total sample activities were below background.
OU8:				
Site 300				
Building 801				
	Tritium	5 of 10	480 pCi/Lsm	Maximum detection is very close to background, especially when considering error range (+/- 110 pCi/Lsm). Samples were taken over 10 years ago, and the maximum activity concentration has now decayed to less than 273 pCi/Lsm +/- 110 (tritium half-life is 12.3 years), which is below background (300 pCi/Lsm).
Building 833				
Surface soil	Bis(2-ethylhexyl) phthalate	1 of 15	2.8	Only one reported detection makes this result inconclusive. Residential soil PRG is 32 mg/kg. Common laboratory contaminant.
	Bromacil	1 of 10	1.9	Samples collected in the vicinity of Building 841. No further action was agreed to by the regulatory agencies (see Table 1-2).
	p,p-DDE	6 of 16	0.0073	Samples collected in the vicinity of Building 841. No further action was agreed to by the regulatory agencies (see Table 1-2).
	p,p-DDT	7 of 16	0.017	Samples collected in the vicinity of Building 841. No further action was agreed to by the regulatory agencies (see Table 1-2).
	Phenanthrene	1 of 15	1.4	Only one reported detection makes this result inconclusive. Common component in tar and building products.

Table 1-24. Screening of contaminants of potential concern (COPCs) in soil/rock (surface and subsurface). (Cont. Page 4 of 5)

OU/Media	Contaminant of potential concern	No. of detections/No. of samples	Maximum concentration (mg/kg)	Rationale for screening out contaminant
Building 833 (cont.)				
Surface soil	Pyrene	1 of 15	1.5	Only one reported detection makes this result inconclusive. Residential soil PRG is 100 mg/kg.
Subsurface soil/rock	p,p-DDT	1 of 23	0.038	Samples collected in the vicinity of Building 841. No further action was agreed to by the regulatory agencies (see Table 1-2).
	Silver	1 of 27	1.2	Residential soil PRG is 370 mg/kg. Insufficient data to determine background. Source is not clear; could be natural constituent of soil/bedrock.
	Tritium	1 of 32	440 pCi/Lsm	Maximum detection is very close to background, especially when considering error range (+/- 150 pCi/Lsm). Samples were taken 8 year ago, and the activity concentration has now decayed to 280 pCi/Lsm +/- 150 (tritium half-life is 12.3 years), which is below background (300 pCi/Lsm).
Building 845 Firing Table				
Subsurface soil	Tritium	8 of 28	2,000 pCi/Lsm	Calculated risk is below 10^{-6} . Modeling indicates that tritium is not a threat to ground water, and it has not been detected in ground water above background except for a one-time detection of 1,045 pCi/Lsm. This number is suspect as a duplicate sample analysis did not detect tritium activity. This well has otherwise shown a history of non-detections before and after the suspect sample, except for one detection of 138 pCi/Lsm, which is below background (300 pCi/Lsm).

Notes appear on following page.

Table 1-24. Screening out of contaminants of potential concern (COPCs) in soil/rock (surface and subsurface). (Cont. Page 5 of 5)

Note:

pCi/Lsm = Picocuries per liter in soil moisture.

DDE = Dichloro-diphenyl-dichloroethylene.

DDT = Dichloro-diphenyl-trichloroethane.

HMX = A high explosive, known also as octogen or homocyclonite.

RDX = A high explosive, known also as cyclonite or hexogen.

Table 1-25. Contaminants of concern in surface soil at Site 300.

Operable unit (OU)	Contaminant of concern	Historical maximum concentration (in mg/kg unless otherwise indicated)
OU2: Building 834	None	N/A
OU3: Pit 6 Landfill	None	N/A
OU4: HE Process Area	HMX	4.0
	RDX	0.18
OU5: Building 850/Pits 3 & 5		
Building 850 Firing Table & Sandpile	HMX	2.4
	Metals:	
	Beryllium	15
	Cadmium	8.6
	Copper	1,000
	PCB 1254	180
	1,2,3,4,6,7,8 Heptachlorinated (HpC) dibenzo-p-dioxins (DD)	6E-04
	1,2,3,4,6,7,8-HpC dibenzofurans (DF)	6.4E-04
	1,2,3,4,7,8,9-HpCDF	2E-04
	1,2,3,4,7,8-Hexachlorinated (HxC) DD	8.6E-07
	1,2,3,4,7,8-HxCDF	2.3E-03
	1,2,3,6,7,8-HxCDD	3.7E-06
	1,2,3,6,7,8-HxCDF	2.1E-03
	1,2,3,7,8,9-HxCDD	2.4E-06
	1,2,3,7,8,9-HxCDF	2.5E-04
	1,2,3,7,8 Pentachlorinated (PeC) DF	2.6E-03
	2,3,4,6,7,8-HxCDF	7.5E-04
	2,3,4,7,8-PeCDF	9.1E-03
	2,3,7,8-Tetrachlorinated (TC) DD	1.4E-06
	2,3,7,8-TCDD	9.6E-03
	Other HpCDFs	1.3E-03
	Other HpCDDs	1E-04
	Other HxCDFs	1.1E-02
	Other HxCDDs	2E-05
	Octachlorinated (OcC) DFs	1.1E-04
	OcCDDs	5.5E-04
	Other PeCDFs	5.7E-02
	TCDFs	4.8E-02
	Other TCDDs	4.3E-06
	Uranium-238	24.8 pCi/g

Table 1-25. Contaminants of concern in surface soil at Site 300. (Cont. Page 2 of 2)

Operable unit (OU)	Contaminant of concern	Historical maximum concentration (in mg/kg unless otherwise indicated)
Pits 3, 5, and 7	Tritium	18,100 pCi/L_{sm}
	Uranium-238	24 pCi/g
OU6: Building 854	HMX	150
	Metals:	
	Lead	98
	Zinc	1,400
	PCB 1242 (1 of 13)	34
	PCB 1248 (1 of 13)	52
	Tritium	317 pCi/L_{sm}
OU7: Building 832 Canyon	HMX	0.2
OU8: Site 300		
Building 801 Dry Well	None	N/A
Building 833 Area	None	N/A
Building 845 Firing Table	None	N/A
Building 851 Firing Table	RDX	0.131
	Metals:	
	Cadmium	9
	Copper	79
	Zinc	360
	Uranium-238	14.1 pCi/g

Notes:

DD = Dibenzodioxin.

DF = Dibenzofuran.

HMX = High melting explosive.

Hp = Heptachlorinated.

Hx = Hexachlorinated.

N/A = Not applicable.

OcC= Octachlorinated.

OU = Operable Unit.

PCB = Polychlorinated biphenyl.

PeC = Pentachlorinated.

RDX = Research department explosive.

TC = Tetrachlorinated.

Table 1-26. Contaminants of concern in subsurface soil and rock at Site 300.

Operable unit (OU)	Contaminants of concern	Historical maximum concentration (in mg/kg except where noted)
OU2: Building 834		
	<u>VOCs</u>	
	PCE	0.09
	Toluene	0.052
	TCE	970
OU3: Pit 6 Landfill		
	None	N/A
OU4: HE Process Area		
	<u>VOCs^a</u>	
	Benzene	0.9
	Chloroform	0.4
	cis-1,2-DCE	0.026
	Ethylbenzene	0.0006
	Freon 113	0.0031
	Freon 12	0.0024
	Methylene chloride	0.013
	PCE	0.0034
	Toluene	0.003
	TCE	33
	Total xylenes	0.021
	HMX	21
	RDX	3.25
OU5: Building 850/Pits 3 & 5		
Building 850 Firing Table & Sandpile:	Tritium	11,000,000 pCi/L _{sm}
	Uranium-238	28.2 pCi/g
Pits 3, 5, and 7	Tritium	8,090,000 pCi/L _{sm}
	Uranium-238	2.4 pCi/g
OU6: Building 854		
	<u>VOCs</u>	
	TCE	30.7 ^b

Table 1-26. Contaminants of concern in subsurface soil and rock at Site 300. (Cont. Page 2 of 2)

Operable unit (OU)	Contaminants of concern	Historical maximum concentration (in mg/kg except where noted)
OU7: Building 832 Canyon	<u>VOCs</u>	
	Freon 113	0.0016
	Methylene chloride	0.0099
	TCE	6.3
	HMX	0.2
	Nitrate	13.5
OU8: Site 300		
Building 801 Dry Well	<u>VOCs</u>	
	TCE	0.057
Building 802 Firing Table	None	N/A
Building 833 Area	TCE	1.5
Building 845 Firing Table and Landfill Pit 9	HMX	0.054
	Uranium-238	1.2 pCi/g
Building 851 Firing Table	<u>VOCs</u>	
	cis-1,2-DCE	0.012
	TCE	0.0003
	Uranium-238	11 pCi/g

Notes:

DCE = Dichloroethylene.

HMX = High melting explosives.

N/A = Not applicable.

OU = Operable unit.

PCE = Tetrachloroethylene.

RDX = Research department explosive.

TCE = Trichloroethylene.

VOCs = Volatile organic compounds.

^a For individual compounds, risk and the hazard index were below 10^{-6} and 1.0 respectively. However, the total additive risk for all VOCs was 1.42×10^{-6} , therefore all compounds were listed as contaminants of concern.

^b Soil with a reported maximum of 1,000 mg/kg was excavated.

Table 1-27. Contaminants of concern in ground water at Site 300.

Operable Unit (OU)	Contaminant of concern	Historical maximum concentration (µg/L unless otherwise indicated)	Maximum conc. in 1998 (µg/L unless otherwise indicated)	Hydrogeologic units affected
OU2: Building 834				
	<u>VOCs</u>			Qt-Tpsg and Tps-Tnsc ₂
	Acetone ^a	55 (1989)	No analyses	
	Chloroform	950 (1989)	4.3	
	cis-1,2-DCE	540,000 (1990)	160,000	
	PCE	10,000 (1993)	1,400	
	1,1,1-TCA	33,000 ^b (1991)	ND	
	TCE	800,000 (1993)	120,000	
	Toluene ^a	62 (1983)	ND	
	<u>Other</u>			
	TBOS/TKEBS	7,300,000 (1995)	62,000	
	Nitrate (as NO ₃)	480 mg/L (1997)	280 mg/L	
OU3: Pit 6 Landfill				
	<u>VOCs</u>			Qt-Tmss
	Chloroform	14 (1994)	ND	
	1,2-DCA	1.7 (1991)	0.68	
	cis-1,2-DCE	12 (1990)	4.4	
	trans-1,2-DCE	33 (1990)	ND	
	PCE	3.2 (1988)	0.93	
	1,1,1-TCA	13 (1990)	0.55	
	TCE	250 (1988)	15	
	Toluene ^a	17 (1988)	ND	
	<u>Radionuclides</u>			
	Tritium	1,790 pCi/L (1998)	1,790 pCi/L	
	<u>Other</u>			
	Nitrate (as NO ₃)	228 mg/L (1998)	228 mg/L	
	Perchlorate	47.2 (1998)	47.2	

Table 1-27. Contaminants of concern in ground water at Site 300. (Cont. Page 2 of 6)

Operable Unit (OU)	Contaminant of concern	Historical maximum concentration (µg/L unless otherwise indicated)	Maximum conc. in 1998 (µg/L unless otherwise indicated)	Hydrogeologic units affected
OU4: HE Process Area				
Building 815	<u>VOCs</u>			Tps, Tnbs₂, and Tnsc₁
	Chloroform	5.8 (1992)	2.4	
	1,1-DCE	4.7 (1998)	4.7	
	cis-1,2-DCE	3.3 (1993)	2.1	
	TCE	450 (1992)	330	
	Toluene ^a	230 ^b (1987)	ND	
	Total xylenes ^a	17 (1991)	ND	
	<u>Other</u>			
	Carbon disulfide ^a	46 (1992)	ND	
	<u>HE Compounds</u>			Tps and Tnbs₂
HE Lagoons	RDX	350 (1988)	87	
	HMX	67 ^c (1998)	67 ^c	
	4-Amino-2,6-dinitrotoluene	24 (1997)	12	
	<u>Other</u>			
	Nitrate (as NO ₃)	421 mg/L (1994)	102 mg/L	
	Perchlorate	50 (1998)	50	
Burn Pit	<u>VOCs</u>			Tnsc₁
	TCE	1,000 (1993)	310	
	cis-1,2-DCE	12 (1993)	3	
	<u>Other</u>			
	Nitrate (as NO ₃)	111 mg/L (1994)	No analyses	
	Perchlorate	15 (1998)	15	

Table 1-27. Contaminants of concern in ground water at Site 300. (Cont. Page 3 of 6)

Operable Unit (OU)	Contaminant of concern	Historical maximum concentration (µg/L unless otherwise indicated)	Maximum conc. in 1998 (µg/L unless otherwise indicated)	Hydrogeologic units affected
OU5: Building 850/Pits 3 & 5				
Building 850 Firing Table & Sandpile	Radionuclides			Qal-Tmss
	Tritium	471,000 pCi/L (1984)	206,000 pCi/L	
	Uranium-238	18.4 pCi/L (1996)	3.96 pCi/L	
	Other			
	Nitrate (as NO ₃)	140 mg/L (1995)	97 mg/L	
Pits 3, 5, and 7 Landfills	VOCs			Qal-Tmss
	1,1-DCE	11 (1985)	0.75	
	TCE	15 (1995)	3.5	
	Toluene ^a	5.1 (1993)	No analyses	
	Total xylenes ^a	10 (1984)	No analyses	
	Radionuclides			
	Tritium	2,660,000 pCi/L (1998)	2,660,000 pCi/L	
	Uranium-238	187 pCi/L (1998)	187 pCi/L	
	Other			
	Nitrate (as NO ₃)	195 mg/L (1993)	49 mg/L	
	Perchlorate	8.7 (1998)	8.7	
	Pit 1 Landfill	Other		
Perchlorate		6.4 (1998)	6.4	
OU6: Building 854				
	VOCs			Qal-Tmss
	TCE	2,900 (1997)	410	
	Radionuclides			
	Tritium	410 pCi/L (1996)	No analyses	

Table 1-27. Contaminants of concern in ground water at Site 300. (Cont. Page 4 of 6)

Operable Unit (OU)	Contaminant of concern	Historical maximum concentration (µg/L unless otherwise indicated)	Maximum conc. in 1998 (µg/L unless otherwise indicated)	Hydrogeologic units affected
OU6: Building 854 (Cont.)	Uranium-238 (1 well)	2.58^d pCi/L (1996)	No analyses	
	<u>Other</u>			
	Nitrate (as NO₃)	180 mg/L (1996)	81 mg/L	
	Perchlorate	6.5 (1998)	6.5	
OU7: Building 832 Canyon				
Building 830	<u>VOCs</u>			Qal, Tnsc₁, Tnbs₂, Tnbs₁
	Acetone^a	41 (1996)	ND	
	Chloroform	30 (1986)	2.1	
	cis-1,2-DCE	1.4 (1998)	1.4	
	PCE	10 (1998)	10	
	TCE	30,000 (1997)	7,900	
	<u>Other</u>			
	Nitrate (as NO₃)	140 mg/L (1998)	140 mg/L	
	Perchlorate	22 (1998)	22	
	<u>VOCs</u>			
Building 832	cis-1,2-DCE	8.6 (1998)	8.6	Qal, Tnsc₁, Tnbs₂, Tnbs₁
	TCE	1,800 (1998)	1,800	
	<u>Other</u>			
	Nitrate (as NO₃)	501 mg/L (1998)	501 mg/L	
	Perchlorate	14 (1998)	14	

Table 1-27. Contaminants of concern in ground water at Site 300. (Cont. Page 5 of 6)

Operable Unit (OU)	Contaminant of concern	Historical maximum concentration (µg/L unless otherwise indicated)	Maximum conc. in 1998 (µg/L unless otherwise indicated)	Hydrogeologic units affected
OU8: Site 300				
Building 801 Dry Well & Pit 8	<u>VOCs</u>			Qal-Tmss
	Chloroform	2.4 (1992)	ND	
	1,2-DCA	5 (1990)	1.4	
	TCE	6 (1988)	4.1	
	<u>Other</u>			
	Nitrate (as NO ₃)	47 mg/L (1998)	47 mg/L	
Building 802 Firing Table	None	NA	NA	NA
Building 833 Area	<u>VOCs</u>			Qt-Tnsc₂
	Benzene ^a	1.1 (1993)	No analyses	
	cis-1,2-DCE	58 (1993)	ND	
	Toluene ^a	17 (1988)	No analyses	
	TCE	2,100 (1992)	1,100	
Building 845 Firing Table & Pit 9	None	NA	NA	NA
Building 851 Firing Table	<u>VOCs</u>			Qal-Tmss
	Freon 113 ^a	1.1 (1993)	ND	
	PCE ^a	1.7 (1992)	ND	
	1,1,1-TCA ^a	0.8 (1991)	ND	
	TCE ^a	2.7 (1992)	ND	
	<u>Radionuclides</u>			
	Uranium-238	1.3 pCi/L (1990)	No analyses	

Notes and footnotes appear on following page.

Table 1-28. Contaminants of concern in surface water at Site 300.

Operable Unit (OU)	Surface water body affected	Contaminant of concern	Historic maximum concentration (in µg/L)	Maximum concentration for 1998 (in µg/L)
OU2: Building 834				
	None	NA	NA	NA
OU3: Pit 6 Landfill				
	Spring 7 ^a (sampled at BC6-13 ^a)	cis-1,2 DCE	12 (1990)	ND
		trans-1,2-DCE	33 (1990)	ND
		PCE	1.4 (1988)	ND
		TCE	110 (1988)	0.77
	Spring 15 ^a	None		
OU4: HE Process Area				
	Spring 5 ^a (sampled at W-817-03A ^a)	cis-1,2-DCE	3.3 (1993)	2.1
		TCE	150 (1987)	120
	Spring 4	None		
	Spring 14	None		
OU5: Building 850/Pits 3 & 5				
	Spring 6	None		
	Well 8 Spring	Tritium	770,000 pCi/L (1972)	44,500 pCi/L
OU6: Building 854				
	Spring 10	None	NA	NA
	Spring 11	None	NA	NA
OU7: Building 832 Canyon				
Building 830	Spring 3	TCE	200 (1985)	27
Building 832	None	NA	NA	NA
OU8: Site 300				
Building 801 Dry Well	None	NA	NA	NA
Building 802 Firing Table	None	NA	NA	NA

Table 1-28. Contaminants of concern in surface water at Site 300. (Cont. Page 2 of 2)

Operable Unit (OU)	Surface water body affected	Contaminant of concern	Historic maximum concentration (in µg/L)	Maximum concentration for 1998 (in µg/L)
OU8: Site 300 (cont.)				
Building 833	None	NA	NA	NA
Building 845 Firing Table	None	NA	NA	NA
Building 851 Firing Table	None	NA	NA	NA

Notes:

DCE = Dichloroethylene.

NA = Not applicable.

ND = Not detected above method detection limit.

PCE = Tetrachloroethylene.

TCE = Trichloroethylene.

^a No surface flow.

Table 1-29. Summary of Site 300 operable units and release sites.

OU2: Building 834										
The Building 834 OU contains Buildings 834A, B, C, D, E, F, G, H, J, K, L, M, and O and contamination in perched ground water downgradient of the facility. Historical information and analytical data indicate that contaminants were released to the environment at release sites at the core of the Building 834 Complex between the early 1960s and mid-1980s. Approximately 550 gallons of trichloroethylene (TCE), used as a heat transfer media at Building 834, were released through leakage from pipes, pumps, and valves, and from surface spills between 1962 and 1978 (Olsen, 1982). TCE was also released to the septic tank prior to 1978. TCE has been identified as the primary chemical of concern and was (and may locally still be) present in shallow perched water-bearing zone as a dense non-aqueous phase liquid (DNAPL). Other volatile organic compounds (VOCs) have also been detected in ground water, surface soil, and the vadose zone. Tetrabutylorthosilicate and tetra-kis-2-ethylbutylorthosilicate (TBOS/TKEBS), silicon-based lubricants used in the TCE heat transfer system, were released to ground water as a light non-aqueous phase liquid (LNAPL). The regional aquifer (Tnbs ₁) has not been impacted. VOC concentrations in perched ground water have decreased with TCE decreasing from a historical maximum of 800,000 µg/L to 120,000 µg/L in 1998. Concentrations of TBOS/TKEBS and nitrate have shown a similar decrease over time. These concentration reductions are likely attributable in part to the on-going active ground water and soil vapor remediation at Building 834.										
Release sites: Pump Station 834B, Pump Station 834C, Pump Station 834D, Test Cell 834E, Test Cell 834F, Test Cell 834H, Test Cell 834J, and Septic System Effluent.										
Media of concern	Units affected	Contaminants of concern (COCs)/Highest historical concentration	Estimated volume of contaminated media	Estimated contaminant volume	Vadose zone modeling results ^a	Baseline human health risk assessment summary				Baseline ecological risk summary (all media)
						Exposure pathway	Potential COC	Risk	Hazard quotient	Risk/hazard
Ground water	Perched gravels and gravelly sands (Tp _{sg}) of the Qt-Tp _{sg} hydrologic unit. Flow direction: southward Average ground water velocity: 0.1 to 1 ft/day	VOCs: Acetone (55 µg/L) Chloroform (950 µg/L) cis-1,2-Dichloroethylene (DCE) (540,000 µg/L) Tetrachloroethylene (PCE) (10,000 µg/L) 1,1,1-TCA(33,000 µg/L) TCE (800,000 µg/L) Toluene (62 µg/L) TBOS/TKEBS (7,300,000 µg/L) Nitrate (480 mg/L)	TCE: 1,770,000 ft ³ TBOS/TKEBS: 3,710 ft ³ Nitrate: 569,000 ft ³	TCE: 28 gal TBOS/TKEBS: 1.74 gal	NA	Ground water exposure pathways.	All COCs in ground water	<10 ⁻⁶	<1	<ul style="list-style-type: none">The Hazard Index (HI) for inhalation, and combined oral and inhalation, for adult and juvenile ground squirrels and adult and juvenile kit fox exceeds 1 for TCE, PCE, and total VOCs. However there is no unacceptable risk to the ground squirrel population (Section 1.5.3.1).No unacceptable risk from VOCs to adult or juvenile deer.HI for combined oral and inhalation of adult ground squirrels and adult kit fox, and for adult and juvenile deer exceeds 1 for cadmium. However, there is no unacceptable risk to ground squirrel or deer populations (Sections 1.5.3.1 and 1.5.3.2).
Vadose zone	Stratigraphic unit affected: Tp _{sg}	VOCs: PCE (0.09 mg/kg) Toluene (0.052 mg/kg) TCE (970 mg/kg)	VOCs: 590,000 ft ³	VOCs: 270 gal	Not modeled: VOCs have already impacted ground water.	Inhalation of VOCs volatilized from subsurface soil to air: – Inside B834 – Outside in the vicinity of B834	VOCs (TCE & PCE) VOCs (TCE)	1 × 10 ⁻³ 4.5 × 10 ⁻⁵	HI = 36 HI = 3.2	
Surface soil	NA	None	NA	NA	NA	Surface soil exposure pathways.	All VOCs in surface soil	<10 ⁻⁶	<1	
Surface water	None	None	NA	NA	NA	NA	NA	NA	NA	NA
Corrective Actions: Some excavation of VOC-contaminated soil was performed in 1983. Ground water and soil vapor extraction and treatment were initiated in 1995 and are ongoing. Testing of innovative technologies including surfactant injection were performed under an Interim Record of Decision which was signed in 1995. A drainage diversion project was completed in 1998 as a source control measure to prevent the infiltration of rainwater into contaminated media at Building 834 release sites.										
Documentation for remedial investigations and remedial actions: – Site-Wide Remedial Investigation report; Chapter 10 (Webster-Scholten, 1994). – Final Feasibility Study for the Building 834 Operable Unit LLNL Site 300 (Landgraf et al., 1994). – Proposed Plan for Remedial Action at the Building 834 Operable Unit LLNL Site 300 (U.S. DOE, 1995). – Interim Record of Decision for the Building 834 Operable Unit LLNL Site 300 (U.S. DOE, 1995).										

Table 1-29. Summary of Site 300 operable units and release sites. (Cont. Page 2 of 13)

OU3: Pit 6 Landfill										
The Pit 6 Landfill OU consists of the former waste disposal area (Pit 6) and its related ground water contaminant plume. From 1964 to 1973, approximately 1,900 yd ³ of waste was placed in nine unlined debris trenches and animal pits in the Pit 6 Landfill. The buried waste included laboratory and shop debris and biomedical waste. Data indicate that the chlorinated solvent TCE and trace concentration of other VOCs were released to the subsurface from buried debris in the Pit 6 Landfill. VOC concentrations in ground water have naturally attenuated by almost two orders of magnitude over the past few years and are below or close to Maximum Contaminant Levels (MCLs) in all wells. Activities of tritium are above background in two monitor wells indicating a possible localized release from shipment cell 55.										
Release sites: Shipment cell 55 (Tritium) and trench 3 (VOCs).										
						Baseline human health risk assessment summary				Baseline ecological risk summary (all media)
Media of concern	Units affected	Contaminants of concern (COCs)/Highest historical concentration	Estimated volume of contaminated media	Estimated contaminant volume	Vadose zone modeling results ^a	Exposure pathway	Potential COC	Risk	Hazard quotient	Risk/hazard
Ground water	Terrace alluvium (Qt) and shallow bedrock (Tnbs ₁) units of the hydrologic unit. Flow direction: south to southeast. Average ground water velocity: 0.08 ft/day	<u>VOCs</u> TCE (250 µg/L) PCE (3.2 µg/L) cis-1,2-DCE (9.8 µg/L) Trans-1,2-DCE (33 µg/L) 1,1,1- TCA (13 µg/L) 1,2-DCA (1.7 µg/L) Chloroform (14 µg/L) Toluene (17 µg/L) Nitrate (228 mg/L) Perchlorate (65.2 µg/L) Tritium (1,600 pCi/L)	VOCs: 1,250,000 ft ³ Tritium: 705,000 ft ³	VOCs: 0.021 gal Tritium: Insufficient data	NA	Additive risk and HI for residential exposure associated with contaminated ground water from the Pit 6 Landfill OU: – Residential use of ground water. – Inhalation of VOCs that volatilize from the Residence Pond.	VOCs	4 × 10 ^{−6}	HI < 1	<ul style="list-style-type: none">• No unacceptable risk from VOCs or HE to adult or juvenile deer.• No unacceptable risk from high explosives (HE) to adult or juvenile squirrels or kit fox.• HI for inhalation, and combined oral and inhalation for juvenile ground squirrels and juvenile kit fox exceeds 1 for PCE, TCE, and total VOCs. However, there is no unacceptable risk to the ground squirrel population (Section 1.5.3.1).• HI for inhalation, and combined oral and inhalation for adult kit fox exceeds 1 for TCE and total VOCs.• HI for inhalation, and combined oral and inhalation for adult squirrels exceeds 1 for total VOCs. However, there is no unacceptable risk to the ground squirrel population (Section 1.5.3.1).
Vadose zone	NA	None	NA	NA	Not modeled: No COCs	Vadose zone exposure pathways.	None	NA	NA	
Surface soil	NA	None	NA	NA	Not modeled: No COCs	Surface soil exposure pathways.	None	NA	NA	
Surface water	Spring 7	<u>VOCs</u> TCE (110 µg/L) cis-1,2-DCE (12 µg/L) trans-1,2-DCE (33 µg/L) PCE (1.4 µg/L)	NA (Spring 7 has been dry since 1992)	NA	NA	Inhalation of VOCs volatilized from surface water to air in the vicinity of spring 7. Inhalation of VOCs volatilized from surface water to air in the vicinity of the SVRA residence pond.	VOCs VOCs	4 × 10 ^{−5} 3 × 10 ^{−6}	HI = 1.5 HI < 1	
Corrective Actions: Waste contaminated with uranium-238 was exhumed in 1971. The landfill was capped as a removal action in 1997.										
Documentation for remedial investigations and remedial actions: <ul style="list-style-type: none">– Site-Wide Remedial Investigation report; Chapter 12 (Webster-Scholten, 1994).– Draft Final Feasibility Study for the Pit 6 Operable Unit LLNL Site 300 (Devany, et al., 1994) (later redesignated as an Engineering Evaluation/Cost Analysis).– Addendum to the Pit 6 Engineering Evaluation/Cost Analysis LLNL Site 300 (Berry, 1996).– Action Memorandum for the Pit 6 Landfill Operable Unit Removal Action at LLNL Site 300 (Berry, 1997).– Title I and II Design Document.– Post-Closure Plan for the Pit 6 Landfill LLNL Site 300 (L. Ferry and T. Berry, 1998).										

Table 1-29. Summary of Site 300 operable units and release sites (Cont. page 3 of 13)

OU4: High Explosives (HE) Process Area										
The HE Process Area OU consists of Building 815, Building 810, the HE lagoons, the HE Burn Pits, and related downgradient ground water plumes. Building 815 served as a central steam plant for the HE Process Area from 1958 to 1986. Surface spills at the drum storage and dispensing area for the former Building 815 steam plant, where TCE was used to clean pipelines, resulted in the release of TCE to the ground surface. In addition, from 1959 to 1985, waste fluids were discharged to dry well 810A resulting in the release of VOCs to the subsurface. From the mid-to-late 1950s to 1985, wastewater containing HE compounds, nitrate, and perchlorate was discharged to former unlined rinsewater lagoons. These lagoons are believed to have been the primary source of HE compounds, nitrate, and perchlorate in ground water. VOC concentrations in ground water in the Building 815 area have decreased over time with TCE decreasing from a historical maximum of 1,000 µg/L to 330 µg/L in 1998. The concentration reductions are likely attributable to natural attenuation. In the HE Lagoon area, HMX and RDX have generally shown decreasing concentration trends in ground water. Excavation and capping of these lagoons, which was completed in 1989, should prevent further releases of HE compounds and associated constituents (e.g. nitrate and perchlorate). The regional aquifer has not been impacted. Three RCRA-regulated burn pits were located in the vicinity of Building 829 in which HE particulates and cuttings, explosive chemicals, and explosives-contaminated debris were burned. Reportedly nearly 150 kg/month of explosives, reactive chemicals, and explosives-contaminated combustible waste were destroyed at this facility. The facility was operational from the late 1950s until 1998 when the burn pits were capped and closed under RCRA. Historical information and analytic data indicate that HE compounds and VOCs were released to the environment in the vicinity of the HE Burn Pits. Soil analytic data indicate that low levels of HE compounds are present in the upper 10 ft in the vicinity of the burn pits and only sporadic, trace VOCs may be present. Ground water analytic data indicate that a water-bearing zone in the Tnsc ₁ hydrogeologic unit has been impacted with TCE concentrations up to 750 µg/L.										
Release sites: Building 815 TCE Hardstand (VOCs), Building 810 Dry Well (VOCs), HE Lagoon 806/807, HE Lagoons 807A, 807B, 814, 817, 825, 826, 827C/D827E, and 828 (HE compounds, nitrate, and perchlorate), HE Burn Pits (VOCs, nitrate and perchlorate).										
						Baseline human health risk assessment summary				Baseline ecological risk summary (all media)
Media of Concern	Units affected	Contaminants of concern (COCs)/Highest historical concentration	Estimated volume of contaminated media	Estimated contaminant volume	Vadose zone modeling results ^a	Exposure pathway	Potential COC	Risk	Hazard quotient	Risk/hazard
Ground water	B815: Clays and silts (Tps) and shallow bedrock (Tnbs ₂ and Tnsc ₁) HE Lagoons: Clays and silts (Tps) and shallow bedrock (Tnbs ₂) Flow direction: to south-southeast. Average ground water velocity: Approx. 1 ft/day (Tnbs ₂)	B815 VOCs: Chloroform (5.8 µg/L) 1,1-DCE (4.7 µg/L) cis-1,2-DCE (3.3 µg/L) Toluene (230 µg/L) TCE (450 µg/L) Total xylenes (17 µg/L) Carbon disulfide: (46 µg/L) <u>HE Lagoons</u> RDX (350 µg/L) HMX (67 µg/L) 4-Amino-2,6-dinitrotoluene (24 µg/L) Nitrate (421 mg/L) Perchlorate (50 µg/L) <u>HE Burn Pits</u> VOCs: cis-1,2-DCE (12 µg/L) TCE (1,000 µg/L) Nitrate (111 mg/L) Perchlorate (15 µg/L)	TCE: 1,010,000 ft³ Tnbs ₂ : 994,000,000 ft³	TCE: 0.37 gal Tnbs ₂ : 3.25 gal	NA	Ingestion of contaminants in groundwater at hypothetical domestic water-supply well in Tnbs ₂ aquifer at southern site boundary.	VOCs, RDX	1 × 10 ⁻⁵	HI<1	<ul style="list-style-type: none">• No unacceptable risk from VOCs to adult or juvenile squirrels, kit fox, or deer.• No unacceptable risk from HE compounds to adult or juvenile squirrels, kit fox, or deer.• HI for combined oral and inhalation risk for adult squirrels, and for adult and juvenile deer exceeds 1 for cadmium, and for the sum of all metals. However, there is no unacceptable risk to ground squirrel and deer populations (Section 1.5.3.1 and 1.5.3.2).• Except for cadmium, no unacceptable risk from individual metals to adult or juvenile squirrels or deer.• No unacceptable risk from any metals to adult or juvenile kit fox.• The Toxicity Quotient (TQ) at Spring 5 exceeds 1 for copper when using the conservative. California Applied Action Levels (AALs), but is below 1 when using the Federal Ambient Water Quality Criteria (AWQC).
Vadose zone	Stratigraphic unit affected: Tps	VOCs: Benzene (0.9 mg/kg) Chloroform (0.4 mg/kg) cis-1,2-DCE (0.026 mg/kg) Ethylbenzene (0.0006 mg/kg) Freon 113 (0.0031 mg/kg) Freon 12 (0.0024 mg/kg) Methylene chloride (0.013 mg/kg) PCE (0.0034 mg/kg) Toluene (0.003 mg/kg) TCE (33 mg/kg) Total xylenes (0.0021 mg/kg) RDX (3.25 mg/kg) HMX (21 mg/kg)	TCE: 550,000 ft³	TCE: 0.23 gal	Perched horizon: TCE reaches ground water in 50 years (yrs) at a concentration of 216 µg/L. Bedrock aquifer: TCE reaches ground water in 130 yrs at a concentration of 154 µg/L.	Inhalation of VOCs volatilized from subsurface soil to air in the vicinity of B815.	VOCs	1.4 × 10 ⁻⁶	HI<1	
Surface soil	NA	RDX (0.18 mg/kg) HMX (4.0 mg/kg)	Insufficient data	Insufficient data	NA	Surface soil exposure pathways.	All COCs in surface soil	<10 ⁻⁶	HI<1	
Surface water	Spring 5 (sampled at well W-817-03A)	VOCs: cis-1,2-DCE (3.3 µg/L) TCE (150 µg/L)	NA (No surface flow)	NA	NA	Inhalation of VOCs volatilized from the surface of Spring 5.	VOCs	1 × 10 ⁻⁵	HI<1	
Corrective Actions: Ground water extraction is planned as a removal action to control offsite VOC plume migration from Building 815. Building 810 dry well was taken out of service in 1989 and no longer receives contaminated waste water. Lagoon closures completed in 1985–1989. In 1990 and 1989, two former water-supply wells 4 and 6, respectively, were sealed and abandoned to prevent contamination from migrating between aquifers. The HE Burn Pits were capped and closed under RCRA in 1998.										
Documentation for remedial investigations and remedial actions: – Closure Plan for the Decommissioned HE Rinsewater Lagoons at LLNL Site 300 (Carpenter et al., 1988). – Remedial Investigation of Dry Wells, LLNL Site 300 (Lamarre et al., 1989). – Site-Wide Remedial Investigation report; Chapter 13 (Webster-Scholten, 1994). – Engineering Evaluation/Cost Analysis for the Building 815 Operable Unit LLNL Site 300 (Madrid and Jakub, 1997). – Final Closure Plan for the HE Open Burn Treatment Facility at LLNL Site 300 (DOE, 1997) – Action Memorandum for the Building 815 Operable Unit Removal Action at LLNL Site 300 (Jakub, 1998a). – Removal Action Design Workplan for the Building 815 Operable Unit Removal Action at LLNL Site 300 (Jakub, 1998b).										

Table 1-29. Summary of Site 300 operable units and release sites. (Cont. Page 4 of 13)

OU5: Building 850 (B850)/Pits 3 & 5										
The Building 850/Pits 3 & 5 OU includes the B850 firing table and sandpile, landfill pits 3 and 5, and ground water plumes originating at B850 release sites and landfill pits 2, 3, 5, and 7. Tritium was used primarily between 1963 and 1978 in hydrodynamic experiments at the B850 firing table. In addition, the experimental test assemblies sometimes contained uranium-238 and metals. Leaching of contaminants from the firing table gravel has resulted in tritium and uranium contamination of ground water, and subsurface soils. As a result of the dispersion of contaminated shrapnel during explosives testing, surface soil was contaminated with various metals, HMX, and depleted uranium. PCB-bearing shrapnel was also present in this area. During the period from 1962 to 1972, a large volume of sand was stockpiled near the B850 firing table and was periodically used and reused during large experiments, gradually becoming contaminated with tritium. Leaching from this sandpile resulted in release of tritium to ground water and the vadose zone. Tritium activities at Well 8 Spring have decreased from a maximum of 770,000 pCi/L to a 1998 maximum of 44,500 pCi/L. Landfill Pit 3 was used from 1958 until 1967 and Pit 5 was used from 1968 to 1979 to dispose of firing table debris and gravel. Leaching from these unlined landfills resulted in the release of VOCs (Pit 5), uranium-238, and tritium (Pits 3, 5, and 7) to the subsurface. Tritium activities in ground water the vicinity of the B850 firing table have been decreasing from a historical maximum of 471,000 pCi/L to 206,000 pCi/L in 1998 which is likely attributable to natural decay. The maximum activities of both tritium and uranium-238 in ground water near the pits were detected in samples collected in 1998 indicating continued releases of these contaminants from the Pits. VOC concentrations in ground water in the vicinity of Pit 5 have decreased with TCE decreasing from a historical maximum of 24 µg/L to 3.5 µg/L in 1998. The concentration reductions are likely attributable to natural attenuation. Landfill Pit 2 operated from 1956 to 1960 and was used to dispose of firing table waste from Buildings 801 and 802. VOCs were reported in ground water in 1989, but have not been detected since. Although tritium has been detected in subsurface soil/rock, the depth of the maximum detections indicate that the tritium in deep soil/rock is from the transport of tritium in ground water from the Building 850 area. Pit 4 Landfill was used from 1968 until 1979 to dispose of waste generated at Buildings 850 and 851 including firing table gravels; wood, plastic, exploded test assemblies and other waste material generated during firing table experiments. Although elevated tritium activity was detected in shallow soil between Pit 3 and Pit 4, tritium has not been detected at elevated levels in ground water from wells directly downgradient of Pit 4. Pit 4 Landfill was capped in 1992 along with Pits 1 and 7 in compliance with RCRA requirements.										
Release sites: Building 850 Firing Table (HMX, PCBs, tritium, and depleted uranium), Building 850 Sand Pile (tritium), Pit 3 Landfill (tritium), Pit 5 Landfill (VOCs, tritium, and uranium-238), Pit 7 Landfill (tritium and uranium-238).										
Media of concern	Units affected	Contaminants of concern (COCs)/Highest historical concentration	Estimated volume of contaminated media	Estimated contaminant volume	Vadose zone modeling results ^a	Baseline human health risk assessment summary				Baseline ecological risk summary (all media)
						Exposure pathway	Potential COC	Risk	Hazard quotient	Risk/hazard
Ground water	Quaternary alluvium (Qal) and sandstone/claystone bedrock (Tnbs ₁ and Tmss) of the Qal-Tmss hydrogeologic unit Flow direction: east-northeast Average ground water velocity: 0.4 ft/day in alluvium; 0.05 to 1 ft/day in bedrock	<u>B850 Firing Table and Sandpile</u> Tritium (471,000 pCi/L) Uranium-238 (18.4 pCi/L) Nitrate (140 mg/L) <u>Pits 1, 3, 5 and 7</u> VOCs: 1,1-DCE (11 µg/L) Toluene (5.1 µg/L) TCE (15 µg/L) Total xylenes (10 µg/L) Tritium (2,660,000 pCi/L) Uranium-238 (187 pCi/L) Nitrate (195 mg/L) Perchlorate (8.7 µg/L)	<u>B850</u> Tritium: 113,000,000 ft ³ Uranium-238: 960,000 ft ³ <u>Pits 3 & 5</u> Tritium: 8,370,000 ft ³ <u>Pits 5 & 7</u> Uranium-238: 1,500.000 ft ³	Not calculated	NA	Residential use of contaminated ground water from Pit 5 at a hypothetical well located at the northeast Site 300 boundary.	Chloroform	2 ´ 10 ⁻⁶	<1	<ul style="list-style-type: none">• No unacceptable risk from radiological exposure to adult or juvenile ground squirrels, deer, or kit fox.• HI for combined oral and inhalation risk for adult squirrels, and for adult and juvenile deer exceeds 1 for cadmium, and for the sum of VOCs, metals, and HE compounds. However, there is no unacceptable risk to ground squirrel or deer populations (Section 1.5.3.1 and 1.5.3.2).• No unacceptable risk from individual VOCs to adult or juvenile ground squirrels, deer, or kit fox.• Except for cadmium, no unacceptable risk from individual metals to adult or juvenile squirrels or deer.• No unacceptable risk from any metals to adult or juvenile kit fox.• No unacceptable risk from HE to adult or juvenile ground squirrels, deer, or kit fox.• The HI from tritium or uranium-238 is less than 1 for native perennial bunch grasses.
		<u>B850 Firing Table and Sandpile</u> Tritium (11,000,000 pCi/L _{sm}) Uranium (28.2 pCi/g) <u>Pits 3, 5, and 7</u> Tritium (8,090,000 pCi/L _{sm}) Uranium-238 (2.4 pCi/g)	<u>B850</u> Tritium: 261,000 ft ³ <u>Pits 3 & 5</u> Tritium: 4,060,000 ft ³							
		<u>B850 Firing Table and Sandpile</u> Metals: Beryllium (15 mg/kg) Cadmium (8.6 mg/kg) Copper (1,000 mg/kg) HMX (2.4 mg/kg) PCB 1254 (180 mg/kg) CDDs (0.0096 mg/kg) CDFs (0.057 mg/kg) Uranium-238 (24 pCi/g) <u>Pits 3, 5, and 7</u> Tritium (18,100 pCi/L _{sm}) Uranium-238 (24 pCi/g)	Not calculated							
Vadose zone	Statigraphic units affected (Qal & Tnbs ₁)	<u>B850 Firing Table and Sandpile</u> Tritium (11,000,000 pCi/L _{sm}) Uranium (28.2 pCi/g) <u>Pits 3, 5, and 7</u> Tritium (8,090,000 pCi/L _{sm}) Uranium-238 (2.4 pCi/g)	<u>B850</u> Tritium: 261,000 ft ³ <u>Pits 3 & 5</u> Tritium: 4,060,000 ft ³	Not calculated	Tritium reaches ground water in 7 yrs at an activity of 1.3E+06 pCi/L. Uranium reaches ground water in 700 yrs at an activity of 180 pCi/L.	Inhalation of tritium evaporating from subsurface soil to the atmosphere in the vicinity of Pit 3.	Tritium	4 ´ 10 ⁻⁶	<1	<ul style="list-style-type: none">• No unacceptable risk from radiological exposure to adult or juvenile ground squirrels, deer, or kit fox.• HI for combined oral and inhalation risk for adult squirrels, and for adult and juvenile deer exceeds 1 for cadmium, and for the sum of VOCs, metals, and HE compounds. However, there is no unacceptable risk to ground squirrel or deer populations (Section 1.5.3.1 and 1.5.3.2).• No unacceptable risk from individual VOCs to adult or juvenile ground squirrels, deer, or kit fox.• Except for cadmium, no unacceptable risk from individual metals to adult or juvenile squirrels or deer.• No unacceptable risk from any metals to adult or juvenile kit fox.• No unacceptable risk from HE to adult or juvenile ground squirrels, deer, or kit fox.• The HI from tritium or uranium-238 is less than 1 for native perennial bunch grasses.
Surface soil	NA	<u>B850 Firing Table and Sandpile</u> Metals: Beryllium (15 mg/kg) Cadmium (8.6 mg/kg) Copper (1,000 mg/kg) HMX (2.4 mg/kg) PCB 1254 (180 mg/kg) CDDs (0.0096 mg/kg) CDFs (0.057 mg/kg) Uranium-238 (24 pCi/g) <u>Pits 3, 5, and 7</u> Tritium (18,100 pCi/L _{sm}) Uranium-238 (24 pCi/g)	Not calculated	Not calculated	Beryllium reaches ground water in 20,000 yrs at concentrations slightly above background. Cadmium reaches ground water in 3,300 yrs at concentrations above background. Copper reaches ground water in 3,000 yrs at concentrations above background. Uranium reaches ground water in 820 yrs at an activity of 460 pCi/L	Incidental ingestion and direct dermal contact w/contaminants in surface soil in the vicinity of the B850 firing table. Additive risk and HI for onsite adults in the B850 OU: – Inhalation of tritiated vapor (B850 firing table). – Inhalation of resuspended particulates (B850 firing table). – Ingestion and dermal contact w/surface soil (B850 firing table).	PCBs CDDs/ CDFs Total Risk	9.5 ´ 10 ⁻⁵ 5.3 ´ 10 ⁻³ 5.4 ´ 10 ⁻³	<1 <1	

Table 1-29. Summary of Site 300 operable units and release sites. (Cont. Page 5 of 13)

OU5: Building 850 (B850)/Pits 3 & 5 (Cont.)										
Media of concern	Units affected	Contaminants of concern (COCs)/Highest historical concentration	Estimated volume of contaminated media	Estimated contaminant volume	Vadose zone modeling results ^a	Baseline human health risk assessment summary				Baseline ecological risk summary (all media)
						Exposure pathway	Potential COC	Risk	Hazard quotient	Risk/hazard
Surface water	Well 8 Spring	Tritium (770,000 pCi/L)	NA	Not calculated	NA	Inhalation of tritium volatilizing from surface water at Well 8 Spring.	Tritium	1.2 × 10 ⁻³	NA	• The TQ for tritium and uranium-238 is below 1 for Well 8 Spring and Spring 6.
Corrective Actions: Gravel was removed from the Building 850 firing table in 1988. PCB-contaminated firing table debris was removed from the vicinity of the Building 850 firing table in 1998. Pits 1, 4, 7 and a portion of Pit 3 were closed under RCRA in 1992 through pit capping.										
Documentation for remedial investigations and remedial actions: <ul style="list-style-type: none">– Site-Wide Remedial Investigation Report; Chapter 11 (Webster-Scholten, 1994).– Draft Feasibility Study of the Building 850/East Firing Area LLNL Site 300, (Taffet and Oberdorfer, 1991).– Addendum to the Site-Wide Remedial Investigation Report LLNL Site 300: Building 850/Pit 7 Complex Operable Unit (Taffet et al., 1996).– Draft Engineering Evaluation/Cost Analysis Report, LLNL Site 300 Building 850/Pits 3 and 5 Operable Unit (Taffet et al., 1997).– Ground Water Tritium Plume Characterization Summary Report for the Building 850/Pits 3 and 5 Operable Unit, LLNL Site 300 (J. Ziagos and E. Reber-Cox, 1998).										

Table 1-29. Summary of Site 300 operable units and release sites. (Cont. Page 6 of 13)

OU6: Building 854 (B854)										
In 1967, two TCE brine systems were installed at B854. The primary loop connected Buildings 854B and 854G and the secondary loop connected Buildings 854 C, 854D, 854E, and 854F. TCE has been released to subsurface soil in the B854 OU through leaks and discharges of TCE-based heat exchange fluid from the secondary TCE brine system, primarily from outdoor valve stations and from piping between buildings. Both loops were extensively used until 1986, infrequently used after 1986, and removed in 1989. Most spills are believed to have occurred between 1967 and 1984 (Stupfel, 1992). Test equipment in B854H was connected to the TCE brine system via outdoor piping. The valve station at B854H is located in the basement with a catch basin (sump). The sump discharged to the ground surface east of the building at the drain outfall. Discharge at the B854H drain outfall resulted in releases to TCE to the ground surface. VOC concentrations in ground water in the Building 854 area have decreased with TCE decreasing from a historical maximum of 2,900 µg/L to 410 µg/L in 1998. The concentration reductions are likely attributable to natural attenuation. Uranium-238 with a potentially anthropogenic isotope ratio has been detected in ground water in the Building 854 OU, in only one well.										
Release sites: Building 854D (TCE), Building 854E (TCE), Building 854F (TCE), Building 854H Drain Outfall (TCE).										
Media of concern	Units affected	Contaminants of concern (COCs)/ Highest historical concentration	Estimated volume of contaminated media	Estimated contaminant volume	Vadose zone modeling results ^a	Baseline human health risk assessment summary				Baseline ecological risk summary (all media)
						Exposure pathway	Potential COC	Risk	Hazard quotient	Risk/hazard
Ground water	Quaternary landslide deposits (Qls) and sandstone bedrock (Tnbs ₁) of the Qls-Tmss hydrogeologic unit Ground water flow: east-southeast Flow rate: To be determined.	VOCs: TCE (2,900 µg/L) Nitrate (180 mg/L) Perchlorate (6.5 µg/L) Tritium (410 pCi/L) Uranium-238 (2.58 pCi/L)	VOCs: 6,000,000 ft ³	2.73 gal	NA	Not modeled.	–	–	–	• No specific data exist. The affected portion of this OU is paved and did not warrant an ecological assessment.
Vadose zone	Statigraphic units affected: Qls & Tnbs ₁	TCE (30.7 mg/kg)	VOCs: 8,790,000 ft ³	13.1 gal	TCE reaches ground water in 300 years at a concentration of 600 µg/L.	Inhalation of VOCs volatilizing from subsurface soil to air in the vicinity of B854F.	VOCs: 1,2-DCA, chloroform	1.3 × 10 ^{–5}	Not calculated	
						Inhalation of VOCs volatilizing from subsurface soil to air inside B854F.	Chloroform	8.7 × 10 ^{–6}	Not calculated	
						Inhalation of VOCs volatilizing from subsurface soil to air inside B854A.	1,2-DCA	5.1 × 10 ^{–6}	Not calculated	
Surface soil	NA	HMX (150 mg/kg) Metals: Lead (98 mg/kg) Zinc (1,400 mg/kg) PCBs (52 mg/kg) Tritium (317 pCi/L _{sm})	Not calculated.	NA	Modeling indicates no impact above MCLs to ground water from any COC.	Inhalation, incidental ingestion and dermal contact of contaminants in surface soil.	PCBs	6.6 × 10 ^{–5}	NA	
Surface water	Springs 10, 11	None	NA	NA	NA	None	–	–	–	
Corrective Action: TCE-contaminated soil was excavated in 1983 in the vicinity of the Building 854H drain outfall. Surface soil was removed at the northeast corner of Building 854F. The TCE brine systems were removed in 1989.										
Documentation for remedial investigations and remedial actions: – Site-Wide Remedial Investigation Report; Chapter 11 (Webster-Scholten, 1994). – Building 854 Operable Unit Characterization Summary LLNL Site 300 (U.S. DOE, 1998).										

Table 1-29. Summary of Site 300 operable units and release sites. (Cont. Page 7 of 13)

OU7: Building 832 Canyon										
The Building 832 Canyon OU consists of Buildings 830 and 832 release sites and related ground water contaminant plumes. Starting in the late 1950s and early 1960s, facilities at Buildings 830 and 832 were used to test the stability of weapons and weapon components. The use of Buildings 830 and 832 for testing was discontinued in the late 1970s and 1985, respectively. Contaminants, primarily VOCs, were released from Buildings 830 and Building 832 through piping leaks and surface spills where TCE was used as a heat exchange fluid as part of testing activities. Rinse water containing HE compounds was disposed via floor drains in Building 832 leading to a surface discharge outside the building. As a result, HMX has been detected in soil and bedrock. However, no HE compounds have been detected in ground water. Nitrate contamination of ground water in the OU is believed to be the result of a combination of HE-related testing and some septic system releases. Although rinsewater containing HE compounds was likely discharged to one or more small disposal lagoons or dry wells near Building 830, no HE compounds have been detected in any media in this area. However the HE compounds released may have degraded and migrated downward as nitrogenous compounds. Although the source of perchlorate contamination is not known at this time, it is suspected that perchlorate was a component of HE test assemblies. VOC concentrations in ground water in the Building 830 area have decreased with TCE decreasing from a historical maximum of 30,000 µg/L to 7,900 µg/L in 1998. Surface water VOC concentrations at Spring 3 have also decreased from a maximum of 200 µg/L to 27 µg/L in 1998. The concentration reductions are likely attributable to natural attenuation.										
Release sites: Building 830 (B830) and Building 832 (B832).										
Media of concern	Units affected	Contaminants of concern (COCs)/Highest historical concentration	Estimated volume of contaminated media	Estimated contaminant volume	Vadose zone modeling results ^a	Baseline human health risk assessment summary				Baseline ecological risk summary (all media)
						Exposure pathway	Potential COC	Risk	Hazard quotient	Risk/hazard
Ground water	VOCs and nitrate: Alluvium (Qal), and sandstone and siltstone/claystone bedrock (Tnbs ₂ , Tnsc ₁ , Tnbs ₁). Perchlorate: Qal and siltstone/claystone bedrock (Tnsc ₁). Flow direction: south to southeast. Average ground water velocity: Approx. 0.1 to 1 ft/day.	<u>Building 830</u> VOCs: Acetone (41 µg/L) Chloroform (30 µg/L) cis-1,2-DCE (1.4 µg/L) PCE (10 µg/L) TCE (30,000 µg/L) Nitrate (140 mg/L) Perchlorate (22 µg/L) <u>Building 832</u> VOCs: cis-1,2-DCE (8.6 µg/L) TCE (1,800 µg/L) Nitrate (501 mg/L) Perchlorate (14 µg/L)	TCE (4,670,000 ft ³) Nitrate (4,280,000 ft ³) Perchlorate (60,000 ft ³)	TCE (5 gal)	NA	Not modeled.	–	–	–	•No impact from VOCs to adult or juvenile ground squirrels, deer, or kit fox.

Table 1-29. Summary of Site 300 operable units and release sites. (Cont. Page 8 of 13)

OU7: Building 832 Canyon (Cont.)										
Media of concern	Units affected	Contaminants of concern (COCs)/Highest historical concentration	Estimated volume of contaminated media	Estimated contaminant volume	Vadose zone modeling results ^a	Baseline human health risk assessment summary				Baseline ecological risk summary (all media)
						Exposure pathway	Potential COC	Risk	Hazard quotient	Risk/hazard
Vadose zone	VOCs, HE compounds, tritium, nitrate: Qal and Tnsc ₁ .	Building 830 VOCs: Freon 113 (0.0016 mg/kg) Methylene chloride (0.0099 mg/kg) TCE (6.3 mg/kg) Nitrate (13.5 mg/kg) HMX (0.2 mg/kg)	TCE (3,640,000 ft ³) HE compounds (96,000 ft ³)	TCE (0.4 gal)	VOCs already impacted ground water; not modeled. HMX reaches ground water in 50 years at a concentration of 0.13 mg/L. Tritium modeled, no impact.	Inhalation of VOCs volatilizing from subsurface soil to air in the vicinity of B830.	VOCs	1 × 10 ⁻⁵	Not calculated.	
		Building 832 TCE (0.16 mg/kg)				Inhalation of VOCs volatilizing from subsurface soil to air inside B830.	VOCs	2.8 × 10 ⁻⁶	Not calculated.	
Surface soil	NA	HMX (0.2 mg/kg)	NA	Not calculated	See HMX results above	None	VOCs	<10 ⁻⁶	HI<1	
Surface water	Spring 3	VOCs: TCE (200 µg/L)	NA	Not calculated	NA	Inhalation of contaminants volatilizing from surface water (Spring 3) (assumes migration of contaminants from B830 to Spring 3).	VOCs	6.5 × 10 ⁻⁵	2.3	
Corrective Action: Treatability Study is underway to evaluate ground water and soil vapor extraction.										
Documentation for remedial investigations and remedial actions: – Site-Wide Remedial Investigation report; Chapter 9 and 10 (Webster-Scholten, 1994). – Building 832 Canyon Operable Unit Characterization Summary LLNL Site 300 (U.S. DOE, 1997).										

Table 1-29. Summary of Site 300 operable units and release sites. (Cont. Page 9 of 13)

OU8: Building 801 (B801) dry well and Pit 8 Landfill										
The Site-Wide Operable Unit (OU8) consists of all release sites, including the B801 firing table and dry well and related VOC ground water plume, not covered in the individual OUs. Since 1955, explosives testing has been conducted on the B801 firing table. Dispersal of firing table debris has resulted in metal and uranium-238 contamination of surface soils. A dry well, located under B801D was active from the late 1950s to about 1984 (Lamarre et al., 1989). The decommissioned dry well was once connected to a sink in the machine shop at B801B. Waste fluid discharges to the dry well beneath B801D resulted in VOC contamination in subsurface soil and ground water. VOC concentrations in ground water in the Building 801 dry well area have decreased slightly with TCE decreasing from a historical maximum of 6 µg/L to 4 µg/L in 1998. The concentration reductions are likely attributable to natural attenuation. Pit 8 Landfill is unlined and was constructed in 1958 northeast of the Building 801 Complex (Taffet, 1989). Debris from the Building 801 firing table was disposed of in Pit 8 until 1974 when an earthen cover was installed. The total estimated volume of material disposed of in Pit 8 is about 24,700 yd ³ .										
Release sites: Building 801 Dry Well (VOCs).										
Media of concern	Units affected	Contaminants of concern (COCs)/Highest historical concentration	Estimated volume of contaminated media	Estimated contaminant volume	Vadose zone modeling results ^a	Baseline human health risk assessment summary				Baseline ecological risk summary (all media)
						Exposure pathway	Potential COC	Risk	Hazard quotient	Risk/hazard
Ground water	Qal and Tnbs ₁ of the Qal-Tmss hydrologic unit Flow direction: eastward Average ground water velocity: 0.4 ft/day	VOCs: Chloroform (2.4 µg/L) 1,2-DCA (5 µg/L) TCE (6 µg/L) Nitrate (47 mg/L)	VOCs: Insufficient data	VOCs: Insufficient data	NA	Not modeled.	–	–	–	•No unacceptable risk from individual VOCs to adult or juvenile ground squirrels, deer, or kit fox.
Vadose zone	Stratigraphic units: Qal and Tnbs ₁	TCE (0.057 mg/kg)	VOCs: 2,830 ft ³	VOCs: 0.0008 gal	TCE reaches ground water in 200 years at a concentration of 15µg/L.	None	NA	NA	NA	
Surface soil	NA	None	NA	NA	NA	None	None	<10 ⁻⁶	HI<1	
Surface water	None	None	NA	NA	NA	None	None	NA	NA	
Corrective Action: 1,087 yd ³ of gravel was removed from the firing table in 1988. Some soil beneath the firing table gravel was also removed and disposed of in landfill Pit 7. From 1988 to 1998, the firing table gravel was periodically replaced and the gravel and debris removed was temporarily stored in transfer containers until permitting was approved for shipment to the Nevada Test Site (Sator, 1992). In 1998, use of this firing table was discontinued. Firing table gravels and surface soil in the vicinity of the firing table were removed. The dry well was filled with concrete and closed in 1981.										
Documentation for remedial investigations and remedial actions: – Site-Wide Remedial Investigation report; Chapter 11 (Webster-Scholten, 1994). – Firing Table Gravel Cleanup at Lawrence Livermore National Laboratory Site 300 (Lamarre and Taffet, 1989). – Remedial Investigation of Dry Wells LLNL Site 300 (Lamarre et al., 1989). – Remedial Investigation of Landfill Pit 8 LLNL Site 300 (Taffet, 1989).										

Table 1-29. Summary of Site 300 operable units and release sites. (Cont. Page 10 of 13)

OU8: Building 802 firing table										
The Site-Wide Operable Unit (OU8) consists of all release sites, including the Building 802 firing table, not covered in the individual OUs. The firing table at the Building 802 area was used between 1959 and 1979 for conducting high explosives experiments containing tritium, beryllium, thorium, lithium, zinc, uranium-238, barium, and vanadium. Dispersal of firing table debris resulted in surface soil contamination (tritium). Leaching of contaminants from the firing table gravel resulted in the contamination of shallow subsurface soil with tritium. However, there is no risk/hazard with tritium in surface or subsurface soil and modeling indicates that tritium in soil/rock will not impact ground water above background concentrations. No contamination in ground water has been detected.										
Release sites: Building 802 Firing Table.										
Media of concern	Units affected	Contaminants of concern (COCs)/Highest historical concentration	Estimated volume of contaminated media	Estimated contaminant volume	Vadose zone modeling results ^a	Baseline human health risk assessment summary				Baseline ecological risk summary (all media)
						Exposure pathway	Potential COC	Risk	Hazard quotient	Risk/hazard
Ground water	None	None	NA	NA	NA	NA	None	NA	NA	•No unacceptable risk from radiological exposure to adult or juvenile ground squirrels, deer, or kit fox •No unacceptable risk from tritium to native perennial bunch grasses
Vadose zone	NA	None	NA	NA	Tritium modeled: no impact.	Inhalation of contaminants evaporating from subsurface soil to air.	Tritium	<10 ⁻⁶	<1	
Surface soil	NA	None	NA	NA	Tritium modeled: no impact. Uranium (total) reaches ground water in 2,000 years at an activity of 41 pCi/L	Inhalation, ingestion, and dermal contact with contaminants in surface soil.	Metals Uranium-238	<10 ⁻⁶	<1	
Surface water	None	None	NA	NA	NA	NA	None	NA	NA	
Corrective Action: Firing table gravel was removed in 1988.										
Documentation for remedial investigations and remedial actions: – Site-Wide Remedial Investigation report; Chapter 11 (Webster-Scholten, 1994). – Firing Table Gravel Cleanup at Lawrence Livermore National Laboratory Site 300 (Lamarre and Taffet, 1989).										

Table 1-29. Summary of Site 300 operable units and release sites. (Cont. Page 11 of 13)

OU8: Building 833										
The Site-Wide Operable Unit (OU8) consists of all release sites, including Building 833 and related VOC ground water plume, not covered in the individual OUs. Building 833 was used from 1959 to 1982 to conduct thermal and mechanical tests on various mixtures of HE compounds. TCE served exclusively as the heat-transfer fluid at Building 833. Surface discharge of waste fluids occurred through spills, building washdown, rinsewater from the test cell and settling basin, and rinsewater disposal in a disposal lagoon adjacent to Building 833. As a result of these releases, VOC contamination of surface and subsurface soil, and ephemeral perched ground water has occurred. VOC concentrations in ground water in the Building 833 area have decreased slightly with TCE decreasing from a historical maximum of 2,100 µg/L to 1,100 µg/L in 1998. The regional aquifer has not been impacted. The concentration reductions are likely attributable to natural attenuation.										
Release sites: Building 833 Disposal Lagoon, Area north of Building 833, Building 833 Test Cell and Settling Basin.										
Media of concern	Units affected	Contaminants of concern (COCs)/Highest historical concentration	Estimated volume of contaminated media	Estimated contaminant volume	Vadose zone modeling results ^a	Baseline human health risk assessment summary				Baseline ecological risk summary (all media)
						Exposure pathway	Potential COC	Risk	Hazard quotient	Risk/hazard
Ground water	Terrace alluvium (Qt) and shallow clay and silt (Tps) of the Qt-Tnsc ₁₂ hydrologic unit (shallow ephemeral perched ground water present mainly after periods of precipitation)	VOCs: Benzene (1.1 µg/L) cis-1,2-DCE (58 µg/L) Toluene (17 µg/L) TCE (2,100 µg/L)	TCE: 36,000 ft ³	TCE: 0.1 gal	NA	None	NA	NA	NA	• No impact from VOCs to adult or juvenile ground squirrels, deer, or kit fox
Vadose zone	Shallow clay and silt (Tps)	TCE (1.5 mg/kg)	TCE: 1,180,000 ft ³	TCE: 0.1 gal	Not modeled in SWFS. Previous modeling (SWRI, Chapter 9) indicated VOCs in Vadose Zone will not impact regional aquifer.	Inhalation of contaminants volatilizing from subsurface soil to air inside B833.	VOCs	1 × 10 ⁻⁶	<1	
Surface soil	NA	None	NA	NA	NA	None	None	NA	NA	
Surface water	None	None	NA	NA	NA	NA	NA	NA	NA	
Corrective Actions: None required. Monitoring-only remedy accepted at December 8, 1993 RPM meeting.										
Documentation for remedial investigations and remedial actions: – Site-Wide Remedial Investigation report; Chapter 9 (Webster-Scholten, 1994).										

Table 1-29. Summary of Site 300 operable units and release sites. (Cont. Page 12 of 13)

OU8: Building 845 firing table and Landfill Pit 9										
The Site-Wide Operable Unit (OU8) consists of all release sites, including the Building 845 firing table, not covered in the individual OUs. Exposives experiments were conducted at Building 845 from 1958 to 1963 The Building 845 firing table was used for high-explosives experiments that may have occasionally contained tritium and uranium. Leaching of contaminants from the firing table debris has resulted in the contamination of subsurface soil with uranium-238, tritium, and HMX. The Pit 9 Landfill was used prior to 1968 for the disposal of approximately 500-800 lb of firing table debris generated at the Building 845 firing table. No contamination in ground water has been detected.										
Release sites: Building 845 Firing Table.										
Media of concern	Units affected	Contaminants of concern (COCs)/Highest historical concentration	Estimated volume of contaminated media	Estimated contaminant volume	Vadose zone modeling results ^a	Baseline human health risk assessment summary				Baseline ecological risk summary (all media)
						Exposure pathway	Potential COC	Risk	Hazard quotient	Risk/hazard
Ground water	NA	None	NA	NA	NA	NA	–	–	–	• No risk calculated for this Building 845 area, although to be conservative, this data was added to the other individual populations throughout the East/West Firing Area.
Vadose zone	Shallow silty clay, silt and gravels (Qls) and shallow bedrock (Tnbs ₁)	Uranium-238 (1.2 pCi/g) HMX (0.054 mg/kg)	Not calculated	Not calculated	Uranium-238 reaches ground water in 2,800 years at an activity of 42 pCi/L. HMX modeled, no impact above MCL.	Inhalation of contaminants evaporating from subsurface soil to air.	Tritium	<10 ⁻⁶	HI<1	
Surface soil	NA	None	NA	NA	NA	Direct (dermal) contact and incidental ingestion contaminants in surface soil in the EFA/WFA study area.	None	NA	NA	
Surface water	None	None	NA	NA	NA	NA	None	NA	NA	
Corrective Action: In 1988, a total of 1,942 yd ³ of 845 firing table gravel and 390 yd ³ of soil from the 845 firing table berm were removed and disposed of in Pit 1 (Lamarre and Taffet, 1989).										
Documentation for remedial investigations and remedial actions: – Remedial Investigation of Landfill Pit 9, LLNL Site 300 (Taffet and Lamarre, 1989). – Site-Wide Remedial Investigation report; Chapter 11 (Webster-Scholten, 1994). – Firing Table Gravel Cleanup at Lawrence Livermore National Laboratory Site 300 (Lamarre and Taffet, 1989).										

Table 1-29. Summary of Site 300 operable units and release sites. (Cont. Page 13 of 13)

OU8: Building 851 firing table										
The Site-Wide Operable Unit (OU8) consists of all release sites, including the Building 851 firing table, not covered in the individual OUs. The Building 851 firing table has been used to conduct experimental high explosives research for weapons and radiography of explosives devices during destructive testing, since 1962. These explosives experiments at the Building 851 firing table have resulted in the release of cadmium, copper, zinc, RDX, tritium, and uranium-238 to surface soil surrounding the Building 851 firing table. Depleted uranium isotopic signatures (uranium-238) have been detected in four wells in the vicinity of the firing table.										
Release sites: Building 851 Firing Table.										
Media of concern	Units affected	Contaminants of concern (COCs)/Highest historical concentration	Estimated volume of contaminated media	Estimated contaminant volume	Vadose zone modeling results ^a	Baseline human health risk assessment summary				Baseline ecological risk summary (all media)
						Exposure pathway	Potential COC	Risk	Hazard quotient	Risk/hazard
Ground water	Qls and Tnbs ₁ of the Qls-Tmss hydrologic unit Flow direction: southeast Average ground water velocity: To be determined.	VOCs: Freon 113 (1.1 µg/L) PCE (1.7 µg/L) 1,1,1-TCA (0.8 µg/L) TCE (2.7 µg/L) Uranium-238 (1.3 pCi/L)	No current VOC contamination	Not calculated	NA	Not modeled.	–	–	–	•No unacceptable risk from radiological exposure to adult or juvenile ground squirrels, deer, or kit fox.
Vadose zone	Stratigraphic units: Qls and Tnbs ₁	VOCs: cis-1,2-DCE (0.012 mg/kg) TCE (0.0003 mg/kg) Uranium-238 (11 pCi/g)	Not calculated	Not calculated	VOCs not modeled: already impacted ground water. Uranium reaches ground water in 4,600 years at an activity of 786 pCi/L.	Inhalation of contaminants volatilizing from subsurface soil to air.	VOCs	<10 ⁻⁶	<1	
Surface soil	NA	RDX (0.131 mg/kg) Metals: Cadmium (9 mg/kg) Copper (79 mg/kg) Zinc (360 mg/kg) Uranium-238 (14.1 pCi/g)	Not calculated	Not calculated	RDX reaches ground water in 400 years at a concentration of 2.5 µg/L. Uranium reaches ground water in 5,000 years at an activity of 2.5 pCi/L.	Surface soil exposure pathways.	All COCs	<10 ⁻⁶	<1	
Surface water	NA	None	NA	NA	NA	NA	None	NA	NA	
Corrective Action: Firing table gravel was removed in 1988 and replaced periodically afterward.										
Documentation for remedial investigations and remedial actions: – Site-Wide Remedial Investigation report; Chapter 11 (Webster-Scholten, 1994). – Firing Table Gravel Cleanup at Lawrence Livermore National Laboratory Site 300 (Lamarre and Taffet, 1989).										

Notes:
NA = Not applicable.
HI = Hazard index.
^a Only modeling results for contaminants of concern that impacted ground water shown here. See Appendix B, Table B-2 for complete modeling results.